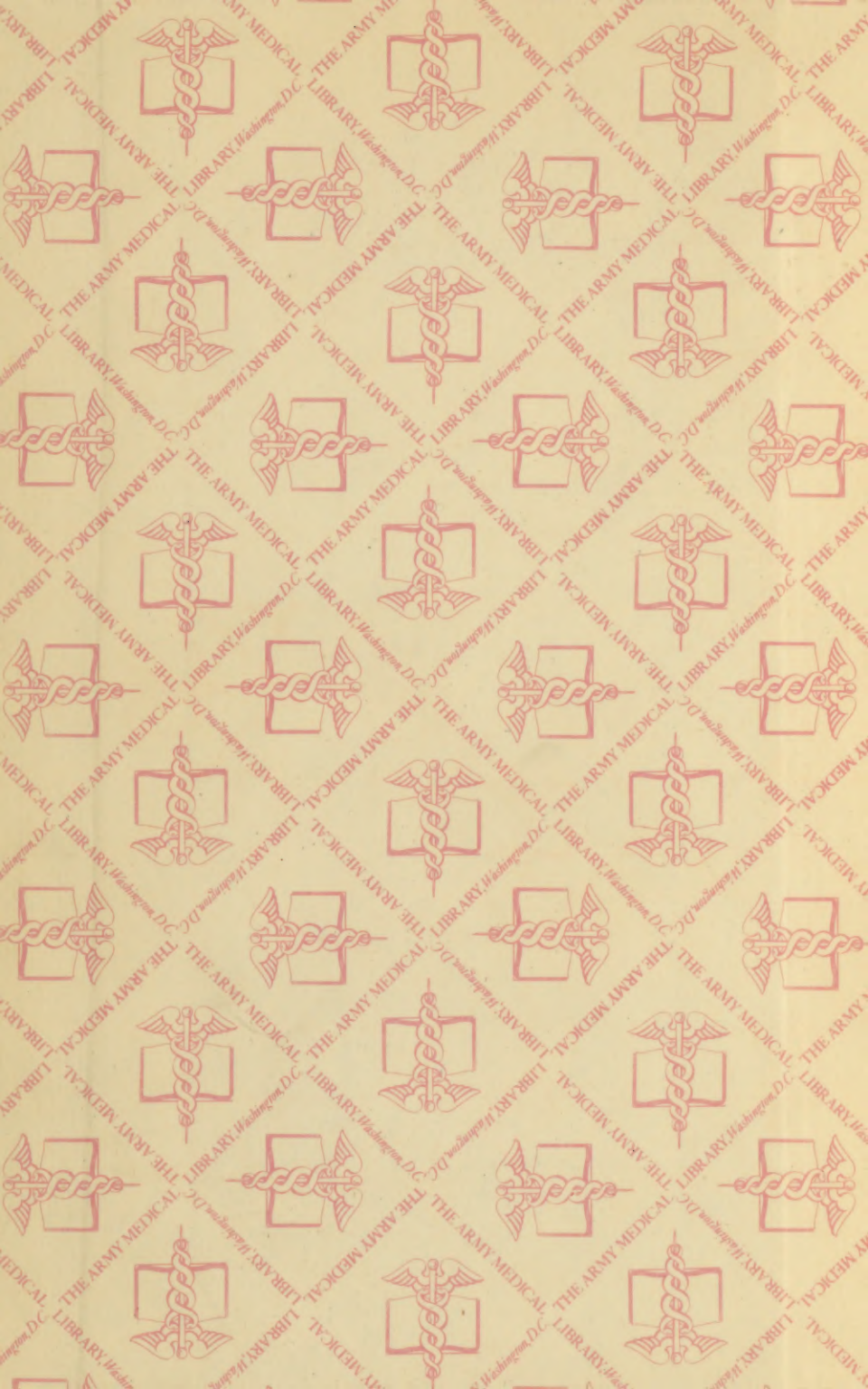
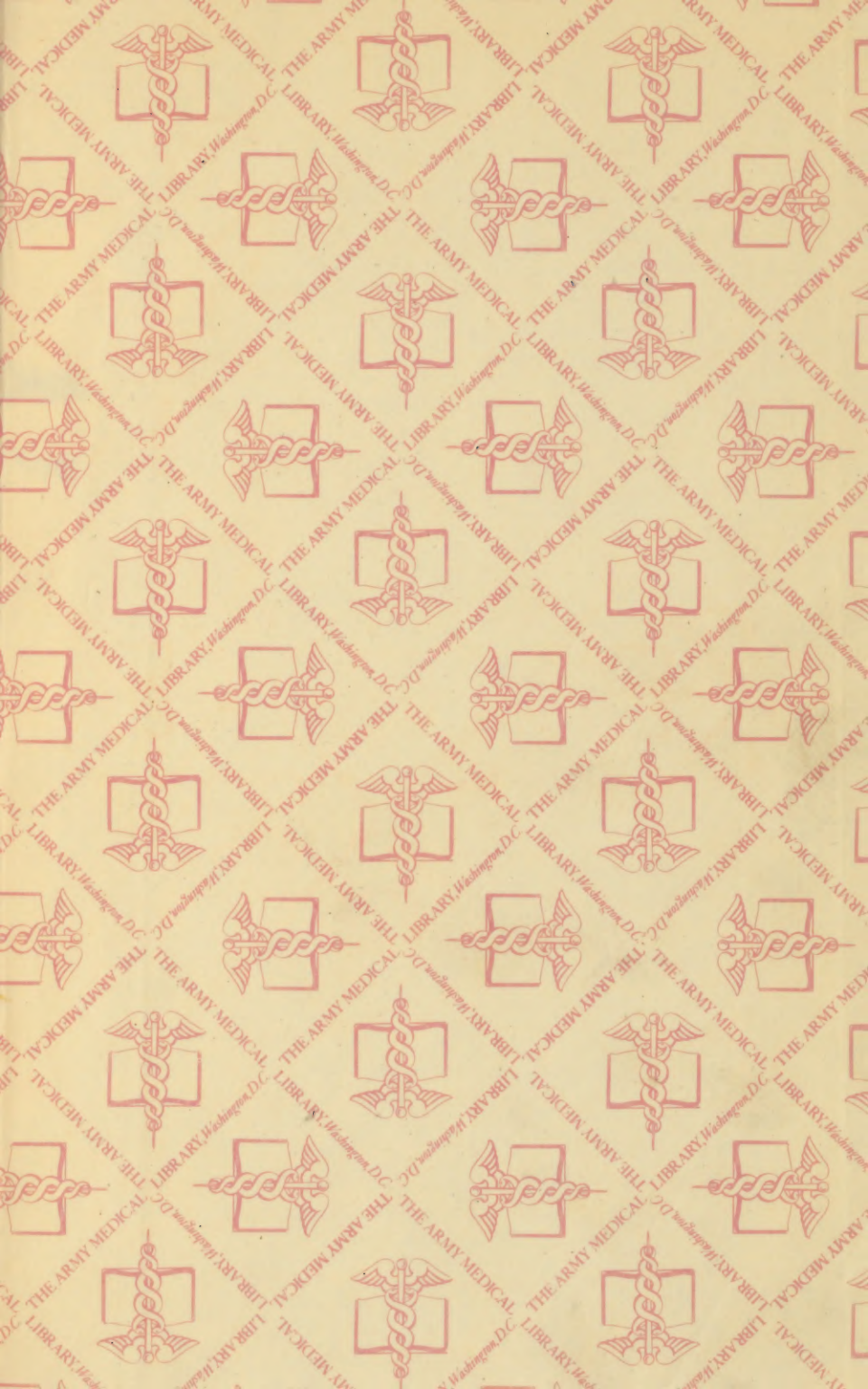




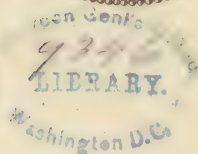


New York, Bellevue Aug 1870

BELLEVUE AND CHARITY HOSPITAL

R E P O R T S.

1870.



NEW YORK:
D. APPLETON AND COMPANY,

90, 92 & 94 GRAND STREET.

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BELLEVUE HOSPITAL.

BELLEVUE HOSPITAL occupies a position on the East River which has long been famous for its beauty and healthfulness. As early as 1786 we find it mentioned among the favorite resorts of persons seeking pleasure and relaxation from business.

In his "Picture of New York, or the Traveller's Guide through the Commercial Metropolis of the United States," first edition, 1807, Dr. Samuel L. Mitchel thus describes Bellevue Hospital among the benevolent institutions of New York: "On the shore of the East River, about three miles from the City Hall, is a delightful spot, of which our celebrated countryman, Lindley Murray, was once the proprietor and resident. It has been purchased by the Common Council for an occasional infirmary; whither, during the prevalence of sickness in the city, it is thought advisable to remove those who languished. A more wholesome air is found here, as well as accommodations for the sick and the convalescent. The selection of such a spot for the reception of the inhabitants who are suffering the violent assaults of the fever, redounds greatly to the feelings and humanity of the Common Council. In common seasons there are no sick persons here. This hospital is opened only upon extraordinary occasions."

The early history of the hospital, and the progressive changes in its management down to the year 1857, were very accurately detailed in an address delivered on the opening of the new wing of Bellevue Hospital, at the request of the

Medical Board, by B. W. McCready, M. D. We quote from this address the following interesting historical facts :

“Up to a very recent period, the history of the charity hospital of this city is confounded with that of the almshouse; the sick were received under the same roof with those who were unable to provide for their own necessities, and the wants of both were cared for by the same officers. According to information furnished me by Mr. David T. Valentine, the excellent clerk of the Common Council, and the industrious chronicler of by-gone times in New Amsterdam, as far back as the year 1699, when the population of the city did not exceed six thousand souls, the poor received partial relief in their own houses, or in lodgings provided for them by the vestry. About fifteen years later, an almshouse was erected on the spot where the City Hall now stands, and where the poor were maintained, partly out of what was then termed the minister's fund, partly by a small tax upon the inhabitants, and by voluntary contributions. After the War of the Revolution had broken out, and previous to the occupation of the city by the British, the poor were removed, first to Westchester County and afterward to Poughkeepsie. On the conclusion of peace, they again returned to the city, where additions were made to the former buildings to accommodate their augmented numbers. The rapid increase of the population, and the immigration which poured in from abroad soon, rendered additional accommodation necessary; a new almshouse was accordingly erected in the rear of the former one, constituting the range of buildings fronting on Chambers Street, and since known as the New City Hall; these were burned down about two years since. The new building was opened for the reception of patients in the year 1795; the same causes that had given rise to the previous changes were still at work, and in fifteen years' time it became necessary to make arrangements for the enlarged accommodation of those who were thrown upon the charities of the city. At that time, the grounds now occupied by the hospital, three miles distant from the city, were destitute of buildings; the neighborhood hilly, varied in surface, and well wooded; the shore bold; the river, unconfined by wharves and bulkheads, ran two hundred feet nearer in shore than it

now does. Well might the wanderer from the distant city, as he saw the bank of the East River, trending away in a graceful sweep toward the north, with Blackwell's Island, still sufficiently wooded, shutting in the view, and the low shores of Long Island, as yet undeformed by factories and buildings in his front—well, I say, might he name the place Bellevue!

"It was this site which was now pitched upon as suitable for the eleemosynary institutions of New York. Between twenty-five and thirty acres were purchased or taken by commissioners from the Kipp and Cruger estates. The first stone of the building which constitutes the present hospital was laid on the 1st of August, 1811. During the War of 1812-'15, with an enemy's fleet blockading the harbor, and an enemy's army at one time threatening a descent upon the city, the work progressed slowly but steadily; finally, in the beginning of 1816, the new buildings were opened for the reception of their inmates; they consisted of the present hospital, three hundred and twenty-five feet in length, fifty-five in depth and three stories in height, with two projecting wings, which was designed as an almshouse, and of a large edifice, some hundred feet in the rear, which was occupied as a penitentiary. The stone which was employed in the buildings was quarried upon the grounds, and their whole cost was, as the record informs us, four hundred and eighteen thousand seven hundred and ninety-four dollars and thirty-four cents.

"The hospital proper was not as yet separated from the almshouse and the penitentiary, but in each of those buildings wards were set apart for the accommodation of those suffering from illness or injury. The medical supervision of the establishment was committed to a visiting or consulting physician, who visited it as often as he deemed necessary, while the immediate attendance upon the sick was intrusted to one or two young physicians who resided in the establishment; thus matters continued until early in the spring of 1825.

"At that time, owing to the neglect of proper sanitary measures, a malignant typhus or jail fever broke out in the penitentiary; the pestilence made rapid progress; the visiting physician, Dr. Charles Drake, contracted the fever and was a long time confined to his house in the city; the two young resident

physicians both sickened; the disease spread to the turnkeys and officers of the house, and general alarm was excited. Under these circumstances, Drs. Jos. Bailey, Jos. M. Smith, and Isaac Wood, were appointed a committee to visit the penitentiary and report upon its condition. They were received by one of the young men, Dr. Belden, who left his bed for the last time to meet them; he died a few days afterward. They found the prison in a dreadful condition, filthy, neglected, without medical attendance. On reporting to Mr. Elisha W. King, the chairman of the committee of the Common Council, he requested the doctors to take the medical charge of the establishment, and to do what was necessary for its renovation. Dr. Bailey at once, from prudential considerations, declined, and the task was undertaken by Drs. Smith and Wood. It was necessary for the penitentiary to be cleared out, but there was a difficulty in the way of this measure. The prisoners were committed for crime, and there was no power in the Common Council to authorize their removal from the penitentiary. Application was at once made to Albany, and an act hurried through the Legislature, authorizing the temporary removal of the prisoners. The building lately occupied as the House of Refuge, but originally erected, on the recommendation of Dr. David Hosack, as a fever hospital, was then nearly finished. It was hastily fitted up, and the prisoners, washed, cleansed, and new clothed, were one by one transported to it; no want of ventilation there, for the rooms were still unceiled; some of the windows boarded up, some imperfectly glazed; air found ready admittance through many a crevice, while guard was regularly mounted over the prisoners, to prevent their running away when convalescent. In a month the pestilence was at an end. Over sixty prisoners were attacked by it, after Drs. Smith and Wood took charge of them; of these only five died, but the keepers, the turnkeys, the nurses, and the medical assistants, fell victims in far larger proportions, and for a long time dropping cases occurred through the city, which could be traced to the jail fever of the penitentiary.

“This occurrence led to a change in the medical department of the almshouse, and Dr. Isaac Wood, who, on the res-

ignation of Dr. Drake, served during the remainder of the year as visiting or consulting physician, was, in January, 1826, appointed resident physician. With Dr. Wood's appointment commenced the permanent separation of the hospital from the almshouse; indeed, the number of the sick poor had now so increased as to demand a separate establishment. The fever hospital, finished and properly fitted up, was appropriated exclusively to those requiring medical or surgical treatment. For seven years, from January, 1826, to the same month in 1833, Dr. Wood ably, and to the satisfaction of the authorities and the public, discharged the duties of his office. He then resigned, and was succeeded by Dr. Stevenson, a gentleman of liberal education and large attainment, but ignorant of hospital duty. Dr. S. served but a year, and then gave place to a gentleman whom we all know and esteem—Dr. Benj. Ogden. In 1837 Dr. Ogden was removed on political grounds, and Dr. Van Hovenberg was resident physician for two years. In 1839 Dr. Van Hovenburg, having been removed, was again succeeded by Dr. Ogden, who finally resigned his office in 1840. The next seven years saw a rapid change of physicians; the office having become a prize for political partisans, every fluctuation of party-power brought with it a change of residents. Old abuses, some of them incident to the character of many of the inmates of the establishment, where the details of the administration were chiefly intrusted to young men, repressed with a strong hand during the firm and enlightened administrations of Drs. Wood and Ogden, broke out with fresh virulence. Licentiousness, disorder, and filth, reached a disgraceful height. While stating the facts, let us not blame too harshly the various residents; for the most part, without experience of hospital duty, they found themselves at the head of an immense establishment, the government of which was too much for one person, even of the highest administrative and professional ability. Under them were placed the young men, advanced students, or newly-graduated physicians, who obtained their appointments by paying a fee to the resident. The latter became bewildered by the weight and magnitude of their duties, and, after perhaps an ineffectual struggle, acquiesced in a state of things they were powerless

to prevent, or, if they continued to struggle on, the disorder was too deeply rooted to be extirpated during the short time they continued in office. A thorough change in the mode of governing the establishment was needed, and it came at a time when the epidemic occurrence of typhus fever raised the existing evils of the establishment to a culminating height. A committee of the Common Council, consisting of James D. Oliver, Washington Smith, and George H. Purser, to whom the subject of the reorganization of the medical department of the public charities was referred, called to their aid a number of prominent medical men, and with their assistance drew up a plan for its future government. With the exception that the office for resident physician was retained, this is the plan which is still in force, and with it a new era commences in the history of our institution. In 1849 the office of resident physician was abolished by the Board of Governors of the almshouse, to whom the control of the establishment had passed, and the administration of the medical department given over entirely to the Medical Board. A few words will complete the sketch I have attempted of the history of our institution. On the completion of the penitentiary on Blackwell's Island, the convicts were transferred from the building in the rear of the present edifice, and this last was occupied as a hospital. In 1848 the almshouse was removed to the building erected for it on the island, and the hospital took its place; the extensive grounds of Bellevue were cut up, and the larger portion sold. The old penitentiary and fever hospital can now scarce be recognized, and in a few years no trace of them will remain; let us hope that the hospital may here be permanent; a more convenient, beautiful, and salubrious site could scarcely be obtained.

“The same causes which have led to such repeated changes in the location of our charitable establishments, to such repeated calls for their enlargement, are still in operation. As our population increases, vice and destitution increase in a much greater ratio. For several years back the hospital has been at times so crowded that it has been necessary annually to open the garrets for the accommodation of patients; dark, low, unceiled, ill-ventilated, stifling in summer, freezing cold

in winter, they were never intended for habitation, and the measure was only had recourse to when forced upon us by necessity. But the Governors have felt that we have no right to poison our patients by confined air, or injure them by unnecessary exposure; that economy ceases to be a virtue when it leads to needless suffering and loss of life; that the taxpayers of our city, heavily as they may be burdened, would sustain them in an expenditure necessary for the well-being of the sick poor. A new wing has been provided, plain, but well adapted to the purposes which it is to subserve, with admirable arrangements for the comfort and cleanliness of the patients. Another year will behold the complete renovation of the old building: Croton water, gas, and proper heating apparatus will be introduced, and the addition of another story will give us ample room for the classification and treatment of our patients; thus the spread of puerperal fever, erysipelas, and typhus, will be stayed, and the mortality and average duration of the illness of the patients be diminished.

“And let us here observe, New York is peculiarly situated in regard to hospital accommodation. Within a comparatively short period, from the size of a provincial town, she has grown to the proportions of a metropolis; her population, in the time allotted to the life of man, has swollen from thirty thousand to eight hundred thousand, and she has had, within a comparatively short time, to provide institutions and public buildings which, in other countries, have been the growth of centuries. She has far less hospital accommodation than any European city approaching her in size. There, hospitals have been the growth for centuries of the union of private charity with the fostering care of government. In 1840, over fifteen million francs, or three million dollars, were expended by the administration of the hospitals of Paris, and a large portion of this sum was derived from the revenue of real estate belonging to the hospitals, and from bequests by charitable individuals. Dublin has eight considerable hospitals, some of them richly endowed by private charity, and yet this year the Government of Great Britain aids them with a grant of sixteen thousand pounds, or eighty thousand dollars. In London, Guy, the founder of Guy's Hospital, after spending one hundred thou-

sand dollars in erecting the building, bequeathed it over a million dollars. Here our rich men have not yet had time to die and endow hospitals, and yet the need for them exists and must be met; the sick poor cry aloud to us to aid them, or they perish; and whatever, in other respects, may be our shortcomings, as a New-Yorker, I am proud to say that here such an appeal has never been made in vain. Let the public be convinced of its truth, and it will demand that it be answered. This necessity for increased hospital accommodation in the city has indeed been felt for some time, and the additions to the City Hospital, St. Vincent's Hospital, that of the Jews, and the noble building of St. Luke's, have been products of its manifestation. These last may, and probably will, like the City Hospital, become the germs of magnificent institutions. They will absorb a portion of the destitution which increases with our wealth and population; but we cannot wait until the death or suffering of thousands awakens private charity from its slumbers. The need was upon us, was felt now, and the Governors of the Almshouse have met it.

“ On first entering on their duties at Bellevue, the Medical Board at once aimed at rendering the institution serviceable for the clinical teaching of medicine; they believed that they would thus elevate the character of the institution; make it an honor to be connected with it; secure the best attainable professional services for its inmates, and partly repay the public for the cost of its maintenance, by improving the education of the rising generation of medical men. These views have since undergone no change; on the contrary, every year strengthens and confirms them. Last winter three hundred students were present at one time, to witness an operation performed by one of the visiting surgeons, in the theatre of the hospital. Could such an audience have been drawn together by mediocrity? or, if drawn together by fortuitous circumstances, would mediocrity and ignorance have dared to face it? Would they not blush in the presence of those who, to a great extent, are able to appreciate their acts? Would they not tremble and shrink under the indignant criticism they would excite? Things are not done here in a corner, and the veil of silence and oblivion drawn over our mistakes. Discussion,

inquiry, and remarks are invited, challenged, and we must be prepared to meet the criticism we provoke. If not impelled by a higher motive, a sacred regard for that most precious of all precious things—human life—a regard that underlies the character of every true physician—would not the care of their own interests and reputation force upon them the most sedulous attention to their patients?

“Medicine cannot be properly taught by books and collegiate lectures alone. To recognize disease we must be familiar with its aspect. The student may be crammed with all the knowledge of the books, and yet, if he has had no clinical teaching, when dismissed with his diploma to practise, he will have to acquire experience at the cost of suffering to his patient, and terrible anxiety to himself. Such experience can only be acquired within the walls of a large hospital, and Bellevue has already become the great clinical school of the city. Daily the visiting physicians and surgeons are accompanied by as many students as can profitably avail themselves of their instructions; and we doubt not the instructions thus received will be found a source of comfort and relief in many a far-off country spot, where the young physician, with no one near to aid him, is forced to rely solely on his own exertions.

“In nominating the young men, who, under the visiting physicians and surgeons, have the immediate care of the patients, it has been customary, in most hospitals, for the officers to use their right of nomination in rotation, thus securing the most desirable situations for their own private students, or obtaining a fee for the favor they conferred. It was at once determined, by the Medical Board, to do away with all such privileges for themselves, to throw the places open to general competition, and to select as their candidates those who, on trial, prove most worthy. Such has been our invariable practice. No questions are asked as to where a young man was born; from what State he came, or from what college he graduated. All are received upon one common footing; all are examined by the same committee, and, after the examination, the only question mooted is the relative merit of the candidates; that this course is the most conducive to the interests of the patients there can be no doubt; we believe

it to be equally conducive to the interests of the young men themselves. They know the terms upon which they are to be received, that they must stand upon their merits alone, and many a young man has been, and will be, incited to the more strenuous prosecution of his studies, by the hope of entering Bellevue Hospital. To this rule we owe the efficiency of our medical staff. Nowhere will be found a more intelligent, better informed, or more capable set of young men, and from among them we look for those who are to be the future pride and honor of our profession.

“ So far, gentlemen, as to our views and expectations ; but what has been the effect of the changes in the Medical Department on those who are most deeply concerned—on the destitute sick who have been committed to our management ? For twenty years previous to the change, the average annual mortality of the institution was twenty per cent. ; since that change, in 1848, the average was reduced to sixteen per cent. ; in 1849, to thirteen ; since that, last year, the medical management has been exclusively under the supervision of the visiting physicians and surgeons—and, notwithstanding that the number of patients is nearly double what it was in 1847, the mortality has been diminished to an average of ten per cent. In the preceding six years, thirty-five thousand and eighty-eight have been under treatment in the hospital. Now, gentlemen, look at this matter in what light you may, scrutinize it as you please, make every allowance and deduction that the most ingenious criticism will enable you to make, and yet the great fact stands out—nearly six hundred lives saved per annum ! Nearly six hundred human beings, who would otherwise have been consigned to an untimely tomb, preserved for the enjoyments, the trials, and the duties of life ! What a mass of misery and suffering prevented ! Nay, if we believe what is indubitable, that faults of omission are almost equally criminal with faults of commission, that when a human being, whose life might have been saved, is suffered to die, the responsibility must rest somewhere, either with individuals or with the community, what a mass of crime is prevented ! In six years, three thousand five hundred lives saved—three thousand five hundred murders prevented—is not that some-

thing of which all who have been connected with the present organization of the hospital, whether it be the members of the Common Council who originated it, or the Board of Governors who perfected it and carried it out, or the medical men who have been their instruments—is not that something in which we can all rejoice—something regarding which we can feel with pride that we have deserved well of the community?

“With enlarged space, with improved ventilation, may we not hope that a still further saving of human life may be effected?—that, with the additional facilities wisely and kindly afforded us by the Board of Governors, the number of students who seek practical instruction at our hospital may be increased?—that from it the blessings of sound, practical medical instruction may be scattered broadcast through the State and the country; and that Bellevue, preëminent as it is in extent, and in the beauty and salubrity of its site, may be equally preëminent in the successful cultivation of medical science, and in the relief of human suffering?”

The hospital continued under the management of the Governors until the year 1860. During the period from 1857 to 1860, the improvements in its construction, in its appointments, and in its management, were steadily prosecuted; the wards were rearranged and better ventilated; the accessory buildings were enlarged and improved; the nurses were selected with greater care; and all the necessities of a large hospital were still further perfected. The advantages of the hospital for medical instruction were liberally developed, and every needed opportunity was given to subordinate this immense storehouse of clinical and pathological facts to the interests of practical medicine, surgery, and obstetrics. At the close of the term of service of the Governors, this hospital had become the habitual resort of the students attending the various medical schools of the city, and was fairly recognized by the medical profession as the legitimate field for clinical study and observation.

On the 17th of April, 1860, the Legislature passed a law organizing the department, and conferring upon the Comptroller of New York the power of appointing four Commissioners of Public Charities and Corrections, whose terms of of-

five should be six years. The commissioners appointed were Simeon Draper, Esq., Moses H. Grinnell, Esq., Isaac Bell, Esq., and James B. Nicholson, Esq., and on the 21st day of April, 1860, they organized by the election of Mr. Draper as president, and Mr. Bell as secretary. Mr. Draper, who had previously been a member of the Board of Governors and had long taken an active interest in those institutions, entered upon the work of reorganization with great zeal and energy, and was ably seconded by the other members of the commission. The reforms instituted were of the most radical kind, giving to every branch of the service the greatest economy and efficiency. Mr. Draper remained connected with the department until nearly the close of his official term of office, when he withdrew to accept the appointment of Collector of the port of New York. Although he was not again connected with the commission, his personal interest in these charitable institutions ceased only with his death in 1866.

We cannot pay a more fitting tribute to the memory of Mr. Draper, than by placing on record in this volume, the preparation and publication of which he several years since encouraged, the following extract from the address of the Governors of the Almshouse on his retirement from the presidency of that body in 1856: "For more than seven years, irrespectively of domestic and personal claims upon his leisure from ordinary business, and, to some minds, the far stronger claims of weariness that asks some respite, regardless of weather, whether storm or sunshine, during the most pestilential, as well as the most healthy seasons, Governor Draper, with the watchfulness and regularity of a military sentinel, has never failed, always once, and frequently twice a week, to visit those outposts of crime and suffering, the various departments of our official care, in which he has ever taken so kindly an interest. He has superintended them all so faithfully and closely, that as the result he is not more known by the inmates than beloved. To the children he is an object of especial attachment. The poor, miserable, abandoned child—the worse than orphan outcast, whose parents have been to it a curse rather than a blessing—has found in him a thoughtful protector; a guardian possessing a heart as well as a head."

On the expiration of the term of service of the first Board of Commissioners in April, 1865, Mr. Draper and Mr. Grinnell retired from the commission, and Mr. Bell and Mr. Nicholson were reappointed, together with James Bowen, Esq., and Owen W. Brennan, Esq., who form the present Commission of Public Charities and Corrections.

The following statement, from the annual report for the year 1868, exhibits the capacity of the hospital, and the results of treatment of those who enter its wards :

The number of patients remaining in hospital, January 1, 1868, was. . .	491
The number of admissions during the year was.....	5,800
The number of births during the year was.....	594
Total number of patients treated during the year.....	7,085
The number of patients discharged, cured, or relieved during the year was.....	5,597
The number of deaths during the year was.....	795
	6,392
Total number of patients remaining in hospital under treatment, De- cember 31, 1868.....	693

PHYSICIANS AND SURGEONS OF BELLEVUE HOSPITAL FROM 1847 TO 1870.

Name and Position.	Date of Ap- pointment.	Date of Death or Resignation.
Valentine Mott, ¹ M. D., Surgeon,	1847	Died, 1865
John W. Francis, ² M. D., Physician,.....	1847	" 1861
James R. Manly, ³ M. D., Physician,.....	1847	" 1851
Alexander H. Stevens, ⁴ M. D., Surgeon,.....	1847	" 1869
Willard Parker, ⁵ M. D., Surgeon,	1847	Resigned, 1853
James R. Wood, M. D., Surgeon,.....	1847	
Wm. H. Van Buren, ⁶ M. D., Surgeon,.....	1847	" 1853
John T. Metcalfe, ⁷ M. D., Physician,.....	1847	" 1859
John O. Stone, M. D., Surgeon,.....	1847	" 1854
F. Campbell Stevens, M. D., Surgeon,.....	1847	" 1848
S. R. Childs, M. D., Surgeon,.....	1847	" 1850
A. G. Elliot, M. D., Physician,.....	1847	" 1849
Alonzo Clark, M. D., Physician,.....	1847	

¹ Consulting Surgeon, 1847-1865.

² Consulting Physician, 1847-1851.

³ Associate Surgeon, 1856-1868. Consulting Surgeon, 1868.

⁶ Consulting Surgeon, 1868.

² Consulting Physician, 1847-1861.

⁴ Consulting Surgeon, 1847-1869.

⁷ Consulting Physician, 1868.

Name and Position.	Date of Appointment.	Date of Death or Resignation.
C. R. Gilman, M. D., Physician,	1847	Resigned, 1850
Stephen Harris, M. D., Physician,	1847	" 1848
S. Conant Foster, M. D., Physician,	1847	" 1853
B. W. McCready, M. D., Physician,	1847	
A. Vaché, M. D., Surgeon,	1848	" 1848
Isaac Green, M. D., Surgeon,	1849	Died, 1854
Thomas F. Cock, M. D., Physician,	1850	Resigned, 1855
A. B. Robeson, M. D., Physician,	1850	Died, 1853
Charles D. Smith, M. D., Surgeon,	1850	Resigned, 1859
Isaac Wood, ¹ M. D., Consulting Physician,	1851	Died, 1868
James C. Forrester, M. D., Physician,	1853	" 1854
John J. Crane, M. D., Surgeon,	1853	
Lewis A. Sayre, M. D., Surgeon,	1853	
Isaac E. Taylor, M. D., Physician,	1853	
George T. Elliot, M. D., Physician,	1854	
John A. Lidell, M. D., Surgeon,	1854	Resigned, 1859
Stephen Smith, M. D., Surgeon,	1854	
B. Fordyce Barker, M. D., Physician,	1855	
John W. S. Gouley, M. D., Surgeon,	1859	
Alexander B. Mott, M. D., Surgeon,	1859	
Charles T. Meir, M. D., Surgeon,	1859	Died, 1863
William H. Church, M. D., Surgeon,	1859	" 1866
Alfred C. Loomis, M. D., Physician,	1859	
John W. Green, M. D., Physician,	1859	Resigned, 1869
Theodore G. Thomas, M. D., Physician,	1860	
Austin Flint, M. D., Physician,	1861	
Frank H. Hamilton, M. D., Surgeon,	1861	
Henry B. Sands, M. D., Surgeon,	1866	
Thomas M. Markoe, M. D., Surgeon,	1868	
Austin Flint, Jr., M. D., Physician,	1869	

¹ Consulting Physician, 1851-1868.



From Nature by R. Kohler.

CERVIX RE-EVERTED.

BELLEVUE AND CHARITY HOSPITAL REPORTS.

I.—PROCIDENTIA UTERI.

On Amputation of the Cervix Uteri in certain forms of Procidentia, and remarks on the Complete Eversion of the Cervix Uteri. By ISAAC E. TAYLOR, M. D., Emeritus Professor of Obstetrics and the Diseases of Women and Children in the Bellevue Hospital Medical College, Attending Physician to Bellevue and the Charity Hospital, Consulting Physician to the State Woman's Hospital, etc.

“PROLAPSUS uteri” and “procidentia uteri” are the terms generally employed to indicate the descent of the uterus from its normal position in the pelvis:

This displacement is ordinarily divided into three degrees:

1. A settling down of the uterus, as if from relaxation. In this case the uterus descends toward the lower part of the pelvis, shortening the vagina in proportion as it fills the upper portion of its cavity, which it distends and pushes before it.

2. The same prolapsus, or descent, is characterized by the presence of the os tincæ at the vulva. The uterus rests on the internal surface of the perinæum, and fills the vagina, the upper half of which becomes folded within itself, like the finger of a glove, with its top turned inward (Gardien). The uterus thus situated takes the direction of the axis of the outlet of the pelvis, that is, of the vagina.

3. In complete prolapsus, or procidentia, the womb has

escaped from the vulva, or os externum. It has now passed the inferior strait, or hangs between the thighs, covered by the vagina. The vagina is invaginated, or turned wholly inside out, and embraces not merely the uterus, and its appendages, but also the bladder, part of the rectum, and some portion of the intestine (Kerkringius, Dugés, Saviard). It may contain not merely the uterus, but frequently the ovaries, with large portions of the round and broad ligaments, portions of the small intestines, the bladder, and rectum (Hodge).

It is upon this last, or third degree, I propose offering some practical observations in the following paper:

The preceding divisions, and the opinions relating to them, which I have given, are from the highest obstetrical authorities, both abroad and in our own country. They have been the recognized views of the medical profession for a very long period. Their correctness, however, has been called in question within the last few (ten) years by M. Huguier.¹

An elaborate memoir was afterward presented by M. Huguier to the Académie de Médecine, in Paris, March 8, 1859, "*sur les allongements hypertrophiques du col de l'utérus, dans les affections désignées sur les noms de descente de précipitation de cet organe, et sur leur traitement, par la résection en l'amputation de la totalité du col suivant la variété de la maladie.*"²

In this memoir M. Huguier maintains that the ordinarily-received opinion is erroneous, and denies emphatically that the appearance of the os uteri at the vulva, or of a greater or less portion of the uterus itself beyond the external organs of generation, is the result of a displacement of the organ, or a general lowering, or that it is a true and complete prolapsus *en totalité*. He holds that this can be shown to depend on inaccurate observations. He contends that when the uterus appears externally, and even when the vagina is completely inverted, and the uterus appears to be entirely prolapsed between the thighs, this condition is not due to the fact that the organ has been generally

¹ *Gazette Hebdomadaire* of 1858.

² *Mémoires Académie de Médecine*, tome 33.

lower in the level, and had completely left the pelvic cavity, but rather to the partial or general hypertrophic elongation of the supra-vaginal portion of the cervix. The best proof he alleges that can be given of this is, that in almost all the cases the fundus of the uterus continues *habitually* in its normal situation, sometimes a little higher, sometimes a little lower, but it always remains in the cavity of the pelvis. In one case it floated in the cavity of the abdomen. If we examine the tumor with care, and measure its cavity by means of the hysterotome, or any other appropriate instrument, the elongation is easily detected. We can also equally assure ourselves of the presence of the body of the organ in the pelvis by careful palpation of the tumor externally; and sometimes by abdominal palpation, or by the rectal touch, we may feel the fundus or the length of the tumor.

The two principal lesions and varieties of the longitudinal hypertrophy are those which affect the uterine neck above or below the insertion of the vagina, and constitute two different diseases, although their nature may be the same.

M. Huguier confines himself, in the second part of his monograph, to the consideration of the longitudinal hypertrophy, which simulates, accompanies, or determines the descent of the uterus, and not to the eccentric form. These two conditions, or lesions, demand separate considerations, as the longitudinal hypertrophy below the insertion of the vagina is not of so much importance. It is easily and simply treated, and will not claim our notice at this time.

The other, the longitudinal hypertrophy of the cervix uteri, *above* the insertion of the vagina, or supra-vaginal portion, is of more importance, and I desire to invite attention to it in this article.

The proposition and negation of M. Huguier, in opposition to the usually received views and opinions, are the result of fifteen years' investigation and labor. After having searched through the various authors who had written on this subject during the last century and a half, he finds no valid proof of a complete case of prolapsus uteri, except two observed by MM. Morel-Lavallée and Blandin. Huguier knows of no others where the characters of the affection have been de-

scribed in such a manner as to leave no doubt as to its exact nature. He therefore denies the frequency of the complete prolapsus; maintains that it is rarely seen, and that it has generally been confounded with the hypertrophic elongation of the superior part of the uterine neck. M. Huguier, to substantiate his views, establishes three kinds of proof:

1. Historic researches.
2. Pathological anatomy.
3. Clinical facts.

Under the first head, reference is made to cases related by Saviard, Morgagni, Dance (1829), and Jules Cloquet. Under the second head, the magnificent work of Cruveilhier is appealed to. All cases where procidentia existed consequent on considerable peritoneal effusion, or with very voluminous ovarian cysts, where the pelvic organs are apt to be pushed downward, are excluded.

All cases of slight descent of the uterus, described by authors under the name of semi-prolapsus, and even those where the neck and vulvo-uterine canal, partly inverted, projected from two to three centimetres (i. e., from three-quarters to one inch) from the vulva, were also excluded.

3. *Clinical Facts.*—There were sixty-four cases of *pretended* complete prolapsus, and of this number only *two* were instances of true and complete prolapsus, unaccompanied by hypertrophic elongation.

In a third case, and the *only one* of that nature, there was at once complete prolapsus, retroflexion, and elongation of the uterine neck above the insertion of the vagina.

It cannot be denied that much credit is due to M. Huguier, desirous, as he is, of establishing a more modern view respecting that affection, in presenting to the profession the results of his close and careful investigation after such an interval of time, and offering, as it does, a new factor in the causes of procidentia uteri. But virtually he resuscitated an old opinion long since expressed. His memoir is very extensive, and one of the most beautifully illustrated works that has ever been produced on uterine disease. Previous to the publication of M. Huguier's memoir in the *Gazette Hebdomadaire*, Morgagni, in his forty-fifth letter, indicates the same fact.

But this fact, it appears, has, in an especial manner, been noticed by M. Levret, *Journal de Médecine, et Chirurgie, et de Pharmacie*, par Roux (1775), tome xl., p. 352. The essay of M. Levret is entitled “Sur un allongement considerable qui survient quelque du col de la matrice.”

This paper appears to have been overlooked by M. Huguier, although he refers to some remarks of M. Levret, who differs from him. M. Huguier uses the word “*hypertrophique*” instead of “considerable” in the title. Levret reports four observations, in which there is a correct and excellent description of this lesion, and indicates the same diagnostic sign as M. Huguier, as new and original. The same view and method were adopted by Morgagni, who only decided his case by the stylet.

Levret introduced a whalebone stylet to ascertain the exact depth of the uterus, and expresses the opinion that none of the old obstetrical authors had known of these cases, where the neck of the uterus may sometimes lengthen at this spot to acquire five to six inches or more, without the body being displaced, and when it was still in the pelvis. As this appears to be so very exact and correct a description of this lesion of the uterus, referred to by M. Huguier, then Levret must be in advance of M. Huguier a full century. The only difference, however, between M. Huguier and M. Levret—and I think it a very important and material one—is this, that M. Huguier considers the hypertrophic elongation as generally existing; while M. Levret considers that the longitudinal hypertrophy of the uterus is accompanied always by only a partial degree of descent of the uterus.

M. Huguier speaks of the affection as a *true* hypertrophy. M. Levret passes no opinion respecting its pathological character, and regards the lesion as only another variety of prolapsus, and says: “The tumor of which we have spoken is a fourth species, composed of an inverted vagina, and the cervix of the womb lengthened, without containing the body of this organ.”

From this investigation, it appears that M. Huguier is not original in presenting this view of the form of disease (so-called prolapsus) under consideration. He is entitled to, and

certainly should claim, the credit and honor of having called the attention of the profession anew to the subject.

He proposes, as a general method of treatment in this class of cases, the amputation of the cervix uteri by the removal of a conical-shaped portion from the hypertrophied part, whether this should be a case of elongated or eccentric character. For procidentia uteri, this had not, I believe, been recommended before, though Lisfranc had, for other diseased conditions of the infra-vaginal portion of the cervix, adopted the amputation of the cervix uteri.

This special lesion of the uterus, as a cause and factor in producing prolapsus uteri, had only occasionally been recognized in ancient times. In more modern times it has attracted recently some attention.

In the museum of St. Bartholemew's Hospital, series 32, a specimen is referred to by Dr. West, in his work on Diseases of Females (pp. 96, 158, 160). Virchow, in the "Geburtshülfe," vol. ii., p. 205, especially uses the name of "prolapsus de la matrice sans descent," or without sinking of the fundus.

Mayer, of Berlin, refers to some cases of a like nature. Cruveilhier, in his "Pathological Anatomy," states that he has invariably observed in prolapsus of the womb an elongation of that organ, accompanied with great *contraction* and *narrowing*, which occurs principally at the junction of the body with the neck.

But he also observes that sometimes this elongation exists, and at *other times* the descent of the womb is greatest, evidently establishing *two* varieties of prolapsus uteri, one *with* descent of the body, and one *without* descent of the body, of the uterus. In some instances he found the lengthening so great that, when seen within the pelvis, the womb appeared to occupy its proper position, and, under these circumstances, it commenced with the inversion of the vagina. Jules Cloquet figures a case in his "Pathological Anatomy" (*surgical*, translated by Cowperthwait, 1832, and which M. Huguier refers to as well as M. Cruveilhier).

Dr. Heming, the translator of Boivin and Dugés's work on "Diseases of the Uterus," reports in the *Edinburgh Medical and Physical Journal*, as far back as 1832 (August, vol.

lxviii.), that he has seen several cases, and says that it is highly important to recognize the distinction between this disease and simple prolapsus. Sufficient has been adduced to show that longitudinal hypertrophy of the supra-vaginal portion of the cervix uteri has been recognized by modern authorities. But with all this it has not received and claimed that attention which it merits, not only in a pathological point of view, but as regards the treatment applicable to it. Becquerel, in his "*Maladies de l'Uterus*," figures, in his plate six, a case measuring five and a half inches. The cases of Heming, West, and others, were uncomplicated cases of the disease. Those of Cruveilhier, Cloquet, and Huguier, had a fibrous tumor or polypus in the body of the uterus. In these cases the tumors may justly be considered as one of the causes in producing or aiding the hypertrophic growth of the uterus. At this time I recall to mind the case of Mrs. V. (1857), whose uterus measured seven and a half inches, and which, under the treatment that was adopted, was reduced to three and a quarter inches after a few months. The patient succumbed a few months after this to tuberculous disease, and, on post-mortem examination, the uterus was found adherent to the colon, and a small fibrous tumor existed in the walls of the uterus, just where the body joins the cervix.

With all that we have advanced on this subject respecting its history, can we yield assent to the views that M. Huguier has promulgated—that the complete exit of the uterus from the vulva is so exceedingly rare, while longitudinal hypertrophy of the cervix above the vagina is so generally frequent, and the fundus of the uterus *habitually* near its normal position?

Scanzoni, Hodge, and Meigs, do not treat of or make any mention of it, and Dr. Sims, in his recent work on "*Surgical Diseases of Females*," merely refers his readers to the work of M. Huguier for further information. It is evident that very different views at the present day are entertained by gynecologists regarding the true meaning of the term *procidencia uteri*. If these views of M. Huguier are correct, it certainly must be apparent that other means should be adopted than appliances of various kinds, such as pessaries, or the opera-

tions of *episiorrhaphy* or *elytrorrhaphy* alone, for the radical cure of procidentia uteri; therefore, I think it follows that if *true* hypertrophic elongation of the supra-vaginal portion of the cervix uteri exists, they could not individually succeed.

Grailly Hewitt (1865), in his work on "Diseases of Women," remarks that "the proper management of these cases must be considered as still open to question, the views of Huguier not having as yet obtained the sanction of all the best authorities on the subject."

I have spoken, in the commencement of this paper, of the three divisions or degrees of prolapsus, which gynecologists have usually adopted. Chelius, however, for simplicity of arrangement, makes but two divisions, though he recognized sometimes the pathological changes in the tissue of the uterus. He divided the prolapsus into "*complete* and *incomplete*." In the "*complete*," the organ projects entirely out of the external parts, and a probe may be introduced into the mouth of the womb, not more deeply than *two inches*.

Paul Dubois adopts only the two degrees. The complete, according to this order, is when the uterus has passed the inferior strait, and the organ is totally without the pelvis (Chute de l'Uterus, Die., 30 vols.). Scanzoni regards it as complete prolapsus when the organ passes the vulva externally, and Nonat, Bernutz, and Aran, hold the same view.

I believe that in this simple arrangement many facts have been lost to science. It is no small merit of M. Huguier that he recognized a new factor as a pathological cause of procidentia uteri, and protested with such emphasis against the negligence of observers. He not only invited but forced modern gynecologists and pathological anatomists to recognize the truth of his assertions, which they had overlooked.

The recent descriptions of procidentia uteri have not been based on pathological anatomy (it appearing to be almost ignored), and the physiological and anatomical examinations have also been made in an incomplete manner. The different forms of this affection have been confounded, and certain displacements, which did not exist, have been admitted. In the practice of some physicians nothing is more common, being an every-day occurrence, than the complete falling of the uterus,

and yet we only occasionally encounter authentic examples in the writings of reliable authors.

The simple division into "complete and incomplete" appears to be the most appropriate, whether we recognize the pathological changes in the cervix or not. The same division answers also, whether we consider this affection as, 1. Idiopathic or primitive, where it has no complications; or, 2. Symptomatic, or where it is associated with other lesions. This last division, I think, has a practical bearing of much importance in treatment. Simple as the division may be, yet it has been falsely interpreted in not recognizing exactly the relations of the prolapsed part, as complete falling of the womb is often spoken of, when the greater portion of the organ, the entire body, is still enclosed in the pelvic cavity, and sometimes raised above the superior strait. This discrepancy arises from a difference of opinion as to the precise limits which separate the complete from the incomplete. Some admit, as does Paul Dubois, that the inferior limit of the pelvic cavity is the inferior strait, that is, a line drawn from the lower part of the *symphysis pubis* to the termination of the coccyx, and, when the body of the organ passes this limit, the prolapsus is complete. Others regard the vulval opening at the base, or exterior, to the labia majora and minora (Hodge).

Modern researches on the anatomy, physiology, and pathology of the uterus enable us, I think, to establish a more physiological division of this affection, and thus have a more just and correct appreciation of its pathological changes. The observation of pathological facts demonstrates that the falling may be consequent upon enlargement of the body, or it may depend entirely upon the cervix. The falling or projection of the cervix externally is then but a symptom of a disease entirely different from those which produce prolapsus of the entire organ.

We know that the cervix and body of the uterus present decidedly different anatomical structures (Richet, Guyon, Sappey), and physiology teaches that the uterine cavity exhibits completely distinct phenomena from the cervix (Kölliker, T. Smith, and others).

In pathology we notice a separation quite as distinct, and

the affections which invade the neck in many diseases do not trespass on the body of the organ. In the discussion which took place in Paris before the Académie de Médecine, April 5, 1859, on M. Huguier's monograph, M. De Paul affirmed that the structure of the cervix differs nothing from that of the body. "Do we not find," he says, "the same tissues, the same anatomical elements? What special structure of this portion (the supra-vaginal portion) can explain an exact limitation of longitudinal hypertrophy? Where and how does M. Huguier give a proof of the existence of the hypertrophy of the supra-vaginal portion?" It is very evident that M. De Paul ignores this grand and useful and practical law which Nature has established. Proofs, by investigation, have asserted the uterine duality, by virtue of which the body and cervix are one. With the uterus in its development, its progressive changes, through its physiological life, and the mutations which age brings with it, there is a kind of perpetual antagonism from infancy to old age, not only in its totality but in its separate portions. To comprehend the subject, therefore, we feel obliged to adopt the simple division which we have stated, viz., complete and incomplete, whether simple or complicated, idiopathic or symptomatic.

The cervix uteri itself is divided by M. Sappey and M. Guyon into two parts—that portion which embraces the glandular part, and the space which intervenes between this and the body, from one-half to three-quarters of an inch long. The cervix comprehends all that portion of the uterus which is above as well as below the reflection of the fundus of the vagina. The hypertrophy may invade as well the superior as the inferior, separately or together, though this M. Huguier admits *does not occur*. For he believes the inferior portion, when hypertrophied, is antagonistic to the superior, and *vice versa*. This is not strictly correct, for I have seen two cases, one in the Charity Hospital (B. L.), and the other in private practice, where not only the infra-vaginal portion was elongated two inches, *but the superior also* two inches, making four inches. M. Verneuil, in the *Gazette Hebdomadaire*, 1859, reports a case with the same lesions.

CAUSES.—The falling of the uterus depends upon a variety

of causes, very different in their nature and their action. They may be divided into those which are *external*, and those which are inherent in the uterus itself. No cause acts with more power and effect than accouchement, whether premature or complete, and the pathological changes which frequently follow it. The more frequently parturition is repeated, the more it acts on all the means of suspension of the uterus, and the uterus itself, and, subsequently, the general economy.

If after accouchement a healthy process has not been established, and the uterus not perfectly involuted, but remains large and weighty, the physiological softening not only invades the uterus itself, but it extends to the ligaments, especially the dartoid structure and the pelvic fascia—those which sustain more perfectly the uterus—and gestation acts also mechanically in stretching and lengthening these ligaments during the whole period of pregnancy. It is well known that when the fibrous tissues have once been stretched, and have lost their elasticity, they seldom recover their former power of sustaining the uterus. They remain relaxed, or they may be lacerated, and this is especially true of the lumbo-sacral ligaments. The rupture of these ligaments is considered by Boivin and Dugés as playing an important rôle in the *mechanism* of procidentia uteri. Nothing is more frequent also than the chronic post-puerperal congestion, or chronic inflammation (as it is sometimes called), which is apt to occur unless a proper reduction of the uterus has taken place.

Out of one hundred and fourteen cases of procidentia uteri which Scanzoni treated, ninety-nine of them were mothers; and, out of the sixty-four cases observed by M. Huguier, sixty-two were mothers. Some of them had from ten to eleven children. These figures, so important at first sight, will, on examination, lose their value, for it appears that in these patients the commencement of the lengthening was not determined, the first symptoms of falling of the uterus not being noticed, and sometimes not even the passing of the cervix from the vulva.

All the cases recorded by M. Huguier have been *mothers*, with the exception of two. In general, the patients belonged to the class of washerwomen or laundresses, for, out of twenty-two observations recorded in his memoir, thirteen were laun-

dresses (or two-thirds of the number), three journalists, and the remainder were distributed as follows: a cook, a nurse, a merchant, and an artist. The ages of twenty-one patients were as follows: eleven were from forty-five to seventy—one-half being forty-five; seven from thirty-three to forty-five; three from nineteen to twenty-six. If we take these facts as bearing upon the age, avocation, and the pregnancy of the patients, and especially the last, they have great significance in their relation to the causes producing the hypertrophic condition of the uterus. In my own experience they are the chief and most constant causes.

During pregnancy and parturition, the uterus undergoes important physiological changes during gestation, not only in regard to the body, but the cervix; and afterward occur the pathological changes incident to a want of proper reduction of the organ to its normal size.

Occasionally mechanical causes (or chronic *idiopathic* congestions) may produce it. We must infer, therefore, that the weight of the uterus, by its own gravity, has brought about a certain form of lengthening of the supra-vaginal portion of the uterus.

Morgagni has asserted in the case that came under his supervision: "It is evident that the uterus, whose *fundus* was somewhat lower down than usual, had been drawn downward by the weight of the vagina thus thickened; unless the cervix, from the very beginning of the disorder, was of such a laxity as to suffer itself to be drawn downward more than the other parts, and be distended into that extraordinary length."

The experience of MM. Bastien and Le Gendre, on the cadaver, permits us to form, approximately, the measure of the force which is necessary to produce a prolapsus or procidentia of the uterus, and to destroy the resistance of the supports of the uterus. With a weight of fifteen kilogrammes (or thirty lbs.) attached to the cervix, it is brought to a level with the orifice of the vulva. Fifty pounds' weight will make it pass this orifice one centimetre, or one-third of an inch.

With a traction of one hundred pounds, the descent continued, and reached a distance of one inch and a quarter. In experiment No. 9, the uterine cavity, before the traction,

measured one inch and five-eighths; after the traction, eight centimetres, or three inches. If this tractive force from above was slow and gradual for some days, the same result was arrived at. The fact that the uterus is, after accouchement, left enlarged, and requiring from six to eight weeks to be restored to a normal size, and to its original structure, is well recognized, and, if not properly involuted, may remain so for many months, and even years. In such cases, in the body of the uterus there is found an enlargement of the parenchyma of the organ. An attentive examination demonstrates the same pathological alterations as occur in chronic engorgements of the womb, though the cavity is doubled.

FIG. 1.



HALF NATURAL SIZE.

- A. Decidua.—B. Body of the uterus.
 C. Internal orifice of the uterus.
 D. Vagina.—E. Os-tinæ. Length of cervix, two and five-eighths inches.

The cervix partakes of the same condition, but is sometimes lengthened during gestation. As this fact has been demon-

strated (of which the diagram, Fig. 1, is only one of many instances occurring under my own observation),¹ then we can plainly perceive how through a physiological process, if not modified by the natural laws, a pathological lesion ensues. We can thus more satisfactorily account for many of these cases of so-called (simulated) *procidencia uteri*. As a general rule, I believe we may assume it as a guide, that the cervix uteri, in its supra-vaginal part, measures from one inch to one inch and a quarter in the unimpregnated female, while that from a female dying soon after parturition, or just before delivery, at full term, measures from one and a half to two inches. In seventeen *post-mortem* examinations, I have observed at full term, or at the very commencement of labor, there was one specimen of a cervix uteri of two inches and five-eighths in length (see Fig. 1), two of two inches and a half, two of two inches and a quarter, and the remaining twelve varied from one inch and three-quarters to two inches.

Boivin and Dugés remark that the cervix uteri, during the early period of gestation, may be lengthened to two inches, but they believe it becomes perfectly obliterated during the last month of pregnancy. Filugelli has remarked that the cervix uteri may lengthen three inches, during the first months of pregnancy, but that it is obliterated at the close. Cazeaux denies this view of Boivin and Filugelli, and so do other gynecologists, but, as I conceive, on incorrect investigation and examinations.

The remarks of Dugés, and Boivin, and Filugelli, are truthful so far as they go, to the third or fourth month; and instead of the cervix uteri becoming obliterated at the very close of pregnancy, *it is the very reverse*. The cervix maintains its normal length to the end of pregnancy, and is physiologically hypertrophied and softened in breadth. In some instances it is lengthened to an extraordinary degree, as the two following cases will attest:

CASE I.—(Reported by Dr. George S. Sherman, House Physician.)—A patient at the Charity Hospital, in October, 1867, 43 years of age, was presented to my notice for *procidencia*

¹ See *New York Medical Times*, June, 1862; also, Transactions State Medical Society, 1865, article *Placenta Prævia*.

uteri of three months' duration. She had ceased to menstruate six months before, and had been irregular the last six months. The uterus was procident from two and a half to three inches. She denied being pregnant. There was no distinct areola, no vomiting, no nausea. The external abdominal examination felt no tumor in the superior strait.

The appearance of the os-tinæ presented nothing that could lead me to suspect gestation in this case. The cervix externally was thick and large, and the neck long and cylindrical, being about the size and thickness of the thumb, and could be felt extending up the vagina nearly three inches. The body of the uterus was not recognized. The rectal and vaginal touch gave the same information.

The sound was introduced, carefully and gently, and the uterus measured ten inches. *Per rectum* the sound could be felt in the pelvis, high up through the long, narrow cervical tube, and no round globular body was ascertained. The patient aborted two days afterward of a fœtus three months and a half old.

The same circumstances were also exhibited in the case which occurred in the Bellevue Hospital, under Dr. Young's and Dr. Stoddard's care. The long cylindrical cervix was felt, but the round globular body of the uterus was not recognized by the various methods of examination. In this case I hesitated to pass the sound at the first examination, simply because the only evidence of gestation was the blueness of the labia of the cervix (not the vagina). The patient positively denied having had any intercourse with any man in four years. After the birth of her child, she did not have her menses for six months. On examining again a second time, very carefully, on all points, I resolved to introduce the sound. The uterus measured eleven inches. Two days afterward, this patient miscarried of a fœtus three months and a half old. On examination of the neck afterward by Dr. Stoddard and myself, the round globular form of the body of the uterus was recognized, with a cervix an inch and a half long, and of about the same breadth as is frequently seen after labor.

In connection with these cases, M. Cazeaux, in his work on "Midwifery," relates a case that he saw at his clinique, in

1849, which he considered a very remarkable case of incomplete prolapsus, during pregnancy—in which the entire neck of the uterus projected beyond the external parts. The cavity of the neck measured two and three quarter inches in length—extending on the sides three and a quarter inches; anteriorly, two and a half inches; posteriorly, two and three fourths inches. Dr. J. C. Nott, formerly of Mobile, now of this city, reports a case, as he supposes, of extraordinary hypertrophy of the cervix uteri, during gestation, Oct. No., 1867, *American Journal of Medical Science*. The measurement was externally three and a half inches in length, and one and a half inches in diameter.

I am aware the views I have presented on this point are in direct contrast to those usually received. They have, however, been fully and carefully substantiated, not only by cases in the living subject, but by several *post-mortem* examinations.

These facts will tend to show, if they do not demonstrate clearly, how cases of hypertrophic elongation may occur, and how the supra-vaginal portion of the cervix becomes of such a considerable length, and of a cylindrical form.

They will corroborate the opinions of M. Huguier as regards the elongation of the cervix and the necessity for the treatment he proposes, though differing pathologically, yet sustaining the views of Levret and Morgagni, though they gave no explanation of the pathology of the disease.

Morgagni, book iii., letter xlv., page 622, remarks on this affection: "On the outside of the labia of the pudenda, which was much dilated, a body three or four inches in length was prominent. This body was of a cylindrical form, thick, and made up of a substance similar to a ligament, and smooth. Being surprised at its unusual length, I cut into the vagina, and within it I found the cervix uteri contained, having become very much larger than it naturally is; nor was this to be wondered at, since the parietes of the cervix itself, and the fundus uteri, were not firm, as they are in their natural state, but extremely lax and flaccid."

Cruveilhier, in relation to this point, observes (Livraison xvi., page 2): "The lengthening of the womb can only be effected by previous softening, in consequence of which the

organ becomes in some degree ductile. This softening may be, perhaps, purely and simply the result of a slight pull on the womb."

Experience teaches us that no tissues are more ductile and distensible than those of the uterus, especially when they have undergone the *ramollissement* consequent on pregnancy, or in some cases of a decided lymphatic constitution.

Huguier and Kiwisch have classed these kinds of cases under hypertrophies. They are not so considered, by others. For it is proved by microscopical examination that the structure of the hypertrophied uterus after accouchement presents no inflammatory or heterologous deposits, but the tissue of the organ retains, as I have before remarked, its histological character, similar to the tissues of the uterus at the ninth month of pregnancy, except only that its component muscular fibres were smaller in size. No fact is more evident than the eccentric hypertrophy of the body of the uterus, and this without the uterus being procident or even prolapsed. We meet with these cases especially after abortion, where the uterus measures from three and a half to four inches, while the os-tineæ may be in its normal position, from two and a half to two inches and three-quarters from the vulva, and occupying its proper axis.

M. Huguier has dwelt very slightly, in his celebrated memoir, on the causes of this affection. Before considering, therefore, other causes producing it, I will refer to the measurements of the uterus of M. Huguier in his own cases. These were twenty-three in number. In three there were no measurements. In the remaining twenty the fundus was inside of the vulva sixteen times, and four times it was outside :

1 case the fundus was inside 18 lines, or 1 inch and $\frac{1}{2}$.					
1	"	"	16	"	1 inch and $\frac{1}{8}$.
1	"	"	14	"	1 inch and $\frac{1}{8}$.
6	"	"	12	"	1 inch.
1	"	"	10	"	$\frac{5}{8}$ of 1 inch.
2	"	"	9	"	$\frac{3}{4}$ of 1 inch.
2	"	"	8	"	$\frac{3}{8}$ of 1 inch.
2	"	"	4	"	$\frac{1}{8}$ of 1 inch.
16 cases.					

These measurements would be materially altered if the

perinaeum was relaxed or ruptured, or if the uterus had been procident for a number of years.

In many cases of procidentia uteri, where there is not the *true* longitudinal hypertrophy, the uterus almost always becomes retroverted, and sometimes retroflexed, before it becomes procident.

If we take the measurements of the uterus in M. Huguier's cases, as he has given them, with the exception of observations 11 and 12, we will have, out of twenty cases (as two are considered as complete by M. Huguier himself), the following result. Out of twenty-two cases, four were outside and eighteen inside, and are as given below:

In 1	the uterus was 8	inches in length.
In 2	"	$4\frac{3}{8}$ "
In 4	"	$4\frac{1}{8}$ "
In 8	"	4 "
In 12	"	under 4 inches.

Not only in these twenty-two cases operated upon, but the average measurements of the sixty-four cases were, as M. Huguier himself admits, 12 centimetres, or 4 inches. The measurement of the two specimens in the Dupuytren Museum was only 10 centimetres, or $3\frac{1}{2}$ inches. These measurements of M. Huguier do not correspond to the kind of cases he has reported as true hypertrophic elongation of the cervix uteri above the vaginal insertion. For further proof of these remarks I shall refer to the diagrams representing Huguier (Fig. 5) and Cruveilhier's (Fig. 6) cases.

The affection is not due solely to the puerperal causes which are so frequent and general, but it may exist previous to pregnancy, as the following case will show:

CASE II.—Sarah J——, aged 18 years (menstruated at 14), admitted to Charity Hospital, November 7, 1865 (reported by Dr. T. D. Bradford, House Physician). "A strong, well-nourished colored girl, unmarried, and never pregnant. While hard at work three years before, lifting, the uterus fell, and has remained procident ever since. She suffers intense pain in the pelvic region, is incapable of walking but very little, and then has to straddle very wide to move along. Amenorrhœa of two months' duration, cervix prolapsed $1\frac{1}{4}$ inches,

very tender and irritable; can scarcely be touched; small os tincæ. The vaginal examination, quietly and carefully made, gives the measurement, both anteriorly and posteriorly, $2\frac{1}{2}$ inches, and from the os tincæ $3\frac{1}{4}$ inches. The cervix uteri is long, slender, and cylindrical, at this height. The rectal touch does not feel the body of the uterus. The abdominal examination, from the excessive tenderness of the pelvis and hypogastric region, is unable to perceive the fundus. A small, thin, metallic sound, introduced gently through the cervix, reaches the extent of from four and three-quarters to five inches. The sound is then felt over the pubis. There was no cystocele or rectocele.

“*Treatment.*—Leeches to the vulva, hyoseyamus pills, 2 gr., three times a day. The leeching to be repeated two or three times. The congested condition overcome December 10th. The uterus was of the same length.

“*December 18th.*—From three-quarters to one inch of the cervix was amputated by the circular method. The patient is to be kept quiet in bed, and suppositories of opium given for a few days.

“*March 1st.*—Patient still remains in the hospital, and the uterus measures three inches. She can walk easily and without much pain.”

This patient came into the Charity Hospital again Feb. 1, 1868, with chronic cellulitis. The uterus measures three inches, and the os uteri is one and a half inches from the vulva. She again left the hospital, and returned shortly afterward, and is now an inmate in the hospital, with the uterus as last reported, February, 1868.

This case might be classed among the congestive variety of this form of disease, as suggested by Bernütz, or it might have been, as Bernütz would consider it, congenital, the congestion occurring afterward. Of the congenital kind, he reports the following, the nature of which is proved by the fact that the same peculiar formation was actually found in one of the patient's sisters, while all the others were sterile:

“*CASE III.*—M. S. W., aged twenty-five, was admitted January 15, 1861, into ‘La Pitié.’ She began to menstruate at fifteen, and continued regular until she was nineteen, when

she ceased to do so for three months, and was troubled with amenorrhœa and sharp pain in the right iliac region. At twenty-one years of age she had to lift heavy weights and work very hard. This caused great pain in the lower part of the body, for which she sought advice, and was told she had prolapsus uteri. She left her situation for a lighter one. Still the pains continued, and she suffered much whenever she sat down. After the inflammation had subsided, a sponge was introduced as a pessary, but could not be borne. After a while, Gariel's pessary was tried, but with no better result. On examination now, the cervix was found to be very low in the vagina, and elongated; the fundus occupying its normal position. The sound measured about three and one-half inches, but did not seem to have reached the fundus. Symptoms of peritoneal inflammation having followed the examination, leeches, blisters, and poultices were ordered. The inflammation gradually subsided, and, on a vaginal examination, the uterus was found retroverted.

"Finding that rest and treatment did no good as regards the allongement or lengthening, while all else had improved, and the parts quiet, amputation of the cervix was determined upon, and performed by M. Maisonneuve, who removed about three-quarters of an inch on the 22d of October.

"*November 21st.*—Patient left the hospital in a greatly improved condition. She married soon after, and was comparatively well when last seen."

This form of cases M. Bernütz not only considers as congenital, but also hereditary in some cases. At any rate, the elongation was, in both these cases, prior to pregnancy, as it was in two of M. Huguier's cases, and in my own case at the Charity Hospital. In the first of M. Huguier's cases, the patient menstruated at nineteen and married at twenty-one. When she was twenty-four years of age, not having yet been pregnant, she felt, after lifting a heavy weight, a sudden sensation, as though something had given way in the abdomen, attended with violent pain in the back. As the acute symptoms abated, the cervix protruded at the vulva. M. Huguier found elongation of the uterine cavity, and well-marked prolapsus. The sudden appearance of the cervix at the vulva is

explained, if we suppose that supra-vaginal elongation was already present, without giving rise to any symptoms, until the strain, by causing prolapsus, revealed the malformation.

The second patient, after having (Observation XXII.) been struck upon the abdomen when sixteen years of age, suffered some pain for a time, and soon after the cervix appeared at the vulva. We may take it for granted that these few cases show that this affliction may exist previous to gestation, and that this peculiar form of the disease may be overlooked, until the accouchement has brought it to light. The congenital elongation may exist apart from prolapsus, and no morbid symptom originate therefrom, until some mechanical or other causes induce a congestive action, when all the symptoms of true and recent prolapsus will become evident.

I have only a few words to say on rectocele and cystocele, as causes of, or in aiding, the elongation of the cervix.

M. Cruveilhier attributes the elongation in these cases to the dragging and pulling of the attachments of the bladder and rectum. It is not necessary for both to exist, to produce it, for true rectocele alone will produce it. Partial cystocele, and rectocele, which I have in many cases seen existing together, may act in quite an opposite way. They may and do become the natural pessary to prevent the farther descent of the uterus only an inch from the vulva, or even sometimes as high up as the middle part of the vagina.

The facts here related show that we may have—1. As the most frequent cause, an enlarged non-involuted uterus, body and cervix. The cervix, becoming lengthened during gestation, and remaining so after delivery, and gradually becoming prolapsed, eventually becomes lengthened by its own gravity, and finally elongated to several inches, while the fundus may remain at the superior strait, if bound down by adhesions, or a chronic cellulitis, or it will be retroflexed internally, or becoming totally procident, with retroflexion externally, and with eversion, partial and complete, of the cervix uteri.

2. The disease may be produced through any cause that may induce congestion of the uterus, and treated accordingly.

3. It may be congenital.

In the external tumor the uterine neck is found presenting

different aspects according as the neck is healthy or diseased. Sometimes the orifice is so small as scarcely to admit the smallest probe. At other times it is, without being in a pathological state, partially or completely everted through its whole length, measuring in some instances from three and a quarter to three and a half inches in diameter. Cases of this nature have been mistaken and considered as a large hypertrophy of the cervix, and have been treated for that disease. This form of the cervix has engaged my attention for a number of years, and for this reason I will offer a few remarks upon it.

The partial or complete *eversion* of the cervix may exist previous to procidentia, and then it acts as a prevention of prolapsus of the uterus. It is more generally noticed after the uterus is procident. This eversion is frequently found in those who have had children, though it *may* be recognized in the primipara. In Boivin's case it was congenital. It was noticed in a very young woman, brought into the "Maison de Santé" in a dying state, with fever, and who died the next day. On *post-mortem* examination the uterus was found internally of a bright-red color, the tissue soft, within the body and cervix of the uterus. The os uteri was everted so as to present a kind of broad, flattened ring around the cervix uteri, in which the inferior and vaginal portion of the cervix was retroverted.*

Seanzoni (page 144, American translation), speaking of the pathological anatomy of the uterus in procidentia, remarks: "The vaginal portion, ordinarily hypertrophied, often hardened, but sometimes also much tumefied and softened, shows a discoloration of a bluish red or slate gray. Around the orifice it is deprived of its epithelium, and covered with erosions and ulcerations more or less deep. Often, after a long duration of the disease, there is a true inversion of the neck. The orifice dilates at first insensibly, and its borders form a circle from one inch to one inch and a half in diameter, through which the neck is everted in such a manner, that the mucous membrane, covered with the glairy mucosity peculiar to the neck, forms after death a bluish-red ring around the orifice which leads to the cavity of the womb."

M. Huguier, page 347, in his monograph, remarks: "There is a third cause of increase (while speaking of the causes of

* Boivin and Dugés (page 99), Heming's translation.

eccentric hypertrophy of the infra-vaginal portion of the cervix) of the uterine orifice, of which the mechanism is physiologically pathological, and entirely without all kinds of traumatism.

“In certain females who have not had infants, but who have suffered for a long time with complete inversion of the vagina, the uterus, in consequence of its increase in weight, tends more and more to descend, and to precipitate itself outward; but it is arrested by the resistance of the vaginal walls, which will not yield, nor prolapse any more, and then they exercise a traction from the centre to the circumference, or, if you wish, from within, outward. The eversion of the vagina causes it to reach sometimes the internal surface of the neck.”

Jobert, Huguier remarks, “appears to us to have been mistaken when, in a lecture which he gave, while referring to this point, he attributes the increase or widening of the infra-vaginal portion of the cervix, and the eversion of its edges outward, to certain muscular fibres of the cervix.” Both of these authors refer to the *inferior* or vaginal part of the cervix uteri as being everted, and term it *extroversion*.

Tyler Smith, in his article on Leucorrhœa (*Medico-surgical Transactions*, vol. xxxv.), gives a plate of a partial eversion through congestion of the cervix, to show that ulceration of the cervix uteri is mistaken sometimes for a partial eversion of the cervix. Boivin and Dugés, Scanzoni and Huguier, make the diameter of the cervix, when everted, from one inch to one inch and a half. This form is very frequent, but the cases I have brought forward and referred to, of which representations are given, measured from two and a half to three and a half inches, precisely double the length of the cervix, and are thus complete eversions of the cervix uteri.

The affection is not very infrequent. Klob, in his “Pathological Anatomy of the Female Sexual Organs” (American translation by Kammerer and Dawson, 1868), remarks, under the head of Prolapsus Uteri, that “a peculiar condition of the cervix uteri is found in the higher degrees of prolapsus uteri. As mentioned above, the external orifice in many cases is so dilated that the cervical canal may be viewed half way up. In some cases the eversion of the cervix may reach such a degree that the internal orifice becomes the external one, the entire cervical canal being everted. The eversion, however, of the

latter is never so complete as that of the vagina; the inner surface of the cervix may become the inferior one of the *tumor* forming the prolapsus, but it is *never* rolled out so far as to form its external surface." In these cases the mucous membrane of the canal, when everted, appears as a bluish-gray ring encircling the entrance to the uterus.

I am gratified to adduce the testimony of the authors as cited, and especially Klob's corroboration of my views on this subject, who gives us the latest pathological view on the subject of eversion of the cervix uteri.

Fig. 2.



HALF NATURAL SIZE.

When I presented this subject before some medical associations, it was deemed unusual, and even excessively rare, and some considered it as impossible.

The cases under my observation were generally complete eversion of the whole cervical canal, and the colored diagram will testify to the description as given by Scanzoni and Klob. The colored plate (Bridget Mathew's case, Case 8.) represents the uterus prolapsed, with the cervix everted, having a partial

cystocele and rectocele; and the second diagram shows the cervix reverted. The third plate (a wood-cut, Fig. 2) shows the uterus returned into the vagina, and the natural appearance and size of the os uteri.

The mechanism of eversion is simple, and presents no difficulty of explanation. In several instances after the reëversion had been made, and the uterus returned into the vagina, by introducing the speculum, the eversion can be seen gradually taking place, as the uterus is again becoming prolapsed along the vagina, as the speculum is withdrawn. It will become completely everted after the uterus becomes procident. It is rolled out in the same manner that the horse's anus is after defecation, just before the closure of anus.

PATHOLOGICAL ANATOMY.

Case reported by Dr. O'Dwyer, House Physician in Charity Hospital.—Hannah Beattie, aged forty years (Ireland), widow, admitted into fever department of the Charity Hospital, Blackwell's Island, December 24, 1867. Suffering from general peritonitis, and double pleuritis. Says she has suffered several years with falling of the womb. Has one son living, nine years of age. She was admitted in a moribund condition, and died on December 25, 1867. On *post-mortem* examination, the uterus was found protruding about two and a half to three inches beyond the vulva (see diagram), with the following measurements. In contrast with this morbid specimen (Fig. 3), which shows the isthmus of the cervix uteri as being the part which is elongated, is a copy of M. Guyon's plate of the isthmus of the cervix as delineated of the natural size.

Measurements of the specimen.

Externally from anterior lip to fundus.....	5 $\frac{7}{8}$ inches.
Internally from anterior lip to fundus.....	5 $\frac{1}{2}$ inches.
Length of body from fundus to the commencement of cervix...	2 $\frac{1}{4}$ inches.
From the commencement of cervix to the os internum (intermediate part).....	1 $\frac{1}{2}$ inch.
From the internal os to the commencement of everted part of cervix.....	$\frac{1}{2}$ inch.
From the commencement of the eversion to os-tineæ.....	$\frac{3}{4}$ inch.
Transverse measurement of everted os.....	2 $\frac{1}{4}$ inches.
Antero-posterior.....	2 $\frac{1}{2}$ inches.
Transverse measurement at the isthmus.....	$\frac{3}{4}$ inch.

Fig. 3.

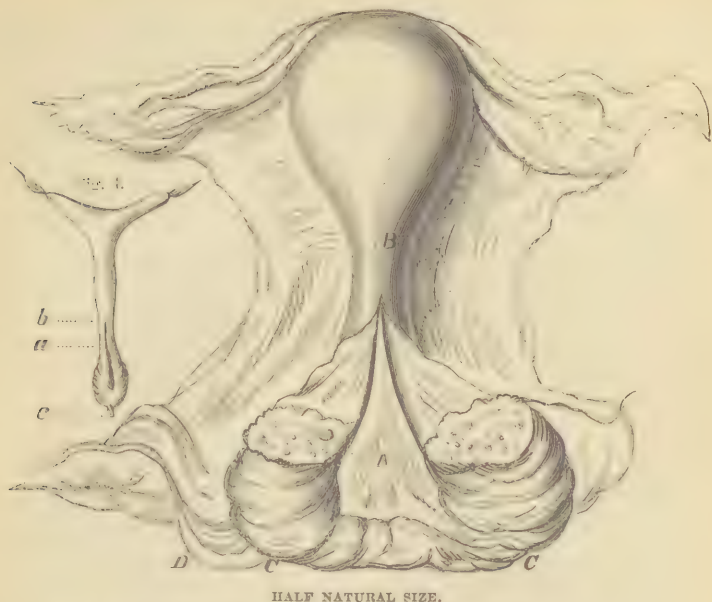


Fig. 3.—A. B. Intermediate part of the cervix, or isthmus.

A. Internal orifice of the uterus. C. External orifice everted. D. Posterior part of vagina.

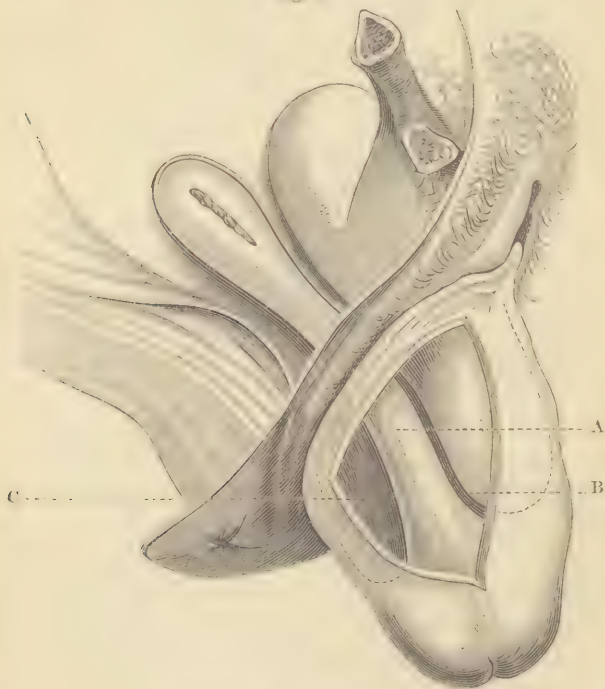
Fig. 4.—Cast of the internal part of the uterus, after M. Guyon, showing the isthmus.

By the diagram it appears, from the measurement, that the glandular part of the cervix is one inch and a quarter in its natural length, and from the os internum to the body of the uterus—the intermediate part or isthmus of the cervix, which, according to the anatomical views of Sappey and Guyon (see Fig. 4), is one-third of an inch—has, in this specimen, increased to one inch and three-quarters, or twenty-one lines, being sixteen or seventeen lines more than natural.

The body, naturally one inch and a sixth (Sappey's measurement), has increased to two inches and a quarter, or twenty-seven lines, nearly double. The specimen presents the lines of demarcation of each part of the uterus so perfectly that there can be no difficulty in defining them. We find the body twice its natural length, and the isthmus, or intermediate part, increased seven times its length, presenting a long, cylindrical, contracted appearance, in contrast to the body or everted

thickened cervix, infra-vaginal portion. The natural breadth of the supra-vaginal portion is preserved through nearly its whole length. If we compare the appearance of the cervix with Cruveilhier's plate, and the appearance and measurements with those of Bernütz and Huguier, we will perceive that the elongated appearance is solely in the intermediate part of the supra-vaginal portion, between the os internum and the body. In the case of Bernütz, taking Sappey and Guyon's measurements of a normal multipara uterus, it would be two inches. In M. Huguier's case, the longest of all his three morbid specimens (Observation XV., plate 5, No. 4), although there were no distinct lines of demarcation between the body and the internal orifice, the isthmus would present five inches.

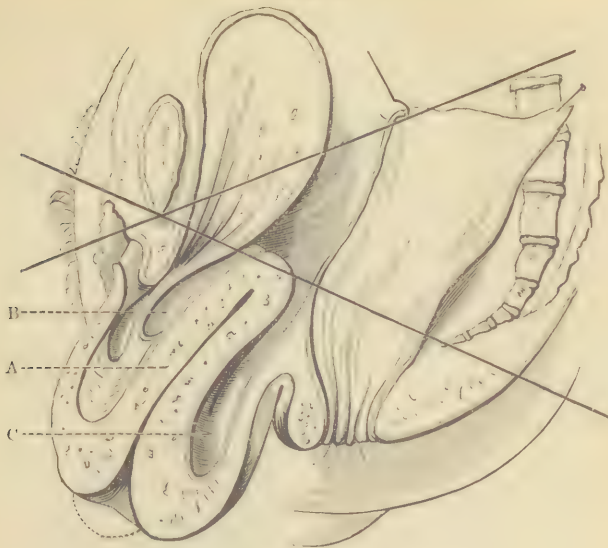
Fig. 5.



HALF NATURAL SIZE.—(AFTER HUGUIER.)

- A. Isthmus or intermediate part.
- B. Anterior peritoneal cul-de-sac.
- C. Posterior peritoneal cul-de-sac.

Fig. 6.



HALF NATURAL SIZE.—(AFTER CRUVEILHIER.)

- A. Isthmus or intermediate part.
- B. Anterior peritoneal cul-de-sac.
- C. Posterior cul-de-sac.

The uterus, in M. Hugnier's case, measured eight inches in length, which is very unusual, and seven and a half inches internally. The proportions are nearly the same for the isthmus as in the case of M. Bernütz and my own, considering the length. In the three morbid specimens which have come under my observation, the same appearance of narrowing existed in that part of the uterus, and it can be demonstrated that there is an elongation of the cervix in the supra-vaginal portion of the uterus, or, more truly, in the intermediate part.

If to the non-shortening of the cervix uteri (as is represented in the diagram, during pregnancy, Fig. 1) there is added noninvolution, the uterus will descend by its own gravity, and become, at first, partially prolapsed, then retroverted, and frequently retroflexed.

From its ductile nature, and ramollissement consequent on gestation, the cervix gradually becomes more and more elongated, until the uterus reaches double its natural length, and

sometimes even to seven, eight, or nine inches. This view is corroborated also by the evidence of the two cases I have referred to, during pregnancy, when the cervix was lengthened to at least five inches in one, and five inches and a half or six inches in the other. The body of the uterus could not, by any of the measurements which would be admitted, if pregnancy existed, at three months and a half be more than four or five inches in length or breadth.

If these views and investigations are correct, they tend to a practical solution of the question of the *so-called hypertrophy* of the superior part of the cervix.

As a further and additional proof, when the uterus is returned into the pelvis, as was supposed by Aran, it has diminished, to *all appearances*, even by the use of the sound, to the extent of one inch. I have, however, referred before to M. Aran's views on this point, and established the fact that the womb is not diminished in length, but is simply retroflexed or doubled up. If a true organic hypertrophy existed, this would or could not occur. I have quoted the opinion of M. Cruveilhier, that the weight of the uterus aided materially in the falling of the womb, though M. De Paul considers this cause as secondary, and attributes it to the particular state of the vagina and the softening of the tissues. He accounts for the lengthening and contraction in this manner: "When a portion of the cervix escapes from the vulva, the resistance is a kind of constriction or narrowing exercised by the inferior orifice of the vulva, producing a kind of strangling, which becomes an efficient cause of a secondary lengthening of the cervix, which is prolapsed, and assumes the form of a calabash."

Now, this form of the uterus will frequently depend upon the inferior part of the cervix, whether it is everted or not. M. De Paul admits the softening and relaxation of the pelvic tissues. The *post-mortem* investigations of M. Huguier, and my own, show that the ligaments are stretched, and sometimes slightly ruptured in one or more places; the constrictor-vaginal muscles were also ruptured; the fibro-dartoid vulva ring (so well described by Richet) was also affected; the perinaeum diminished in length, and, if not relaxed, was ruptured, and thus the intercrossing of the sphincter ani was de-

stroyed, and the support and prop of the whole pelvic viscera gone. There is, therefore, nothing to produce a constriction in the cases of those who have had children, or even in those cases where a relaxed and debilitated constitution exists. If M. De Paul had remembered that the narrowest part of the constriction is above the sphincter muscle, he would have seen that the cause which he alleges producing the contraction cannot be accepted.

It has been asserted by M. Huguier that the body of the uterus seldom or *never* leaves completely the pelvic cavity. The posterior peritoneal cul-de-sac in the specimens I have seen is much lower than the anterior, and varies from one inch to three or four inches in length. I have also noticed it in a few instances so extensive as to cover the whole vulva, presenting a large oval shape, like an ostrich egg, and having an elastic sensation, but not giving a tympanitic sound on percussion. In fact, it is a true procidentia of the posterior vaginal wall.

The posterior cul-de-sac is, therefore, in this kind of procidentia uteri, composed principally of the peritoneum, which has been dragged down, and doubled to the extent, externally, of from one and a half to two or three inches. The anterior layer of the rectum will remain intact in the greater number of cases (see plates of M. Cruveilhier, M. Huguier, and my own), unless a diverticulum has been created by hardened faeces accumulating in the lower part of the rectum, as exhibited in M. Cloquet's diagram.

In all the cases I have noticed, I have found the anterior part of the rectum forming a very slight portion of the prolapsed uterus. This part is the peritoneum, elongated and prolapsed. I know it is considered that the large swelling at the posterior part of the procident uterus is filled with portions of the intestines. Cases have been recorded where the tumor was enormous, and the small intestines even have occupied it (Hodge, Davis, and others).

M. Cruveilhier, in 1842, previous to the publication of his celebrated "Pathological Anatomy," remarked that "the anterior cul-de-sac is so small as not to admit the small intestines, while the posterior cul-de-sac may admit a very great

quantity. It is in cases where the tumor formed by the falling of the uterus acquired a development so considerable as the child's head." M. Cruveilhier, however, afterward, in his "Pathological Anatomy" (p. 576), in 1849, says, positively, that he has "never encountered this appearance in the cadaver," and asks the question, "How shall we explain this invagination of the size of a child's head without it (the descent of the intestines)?"

It is very apparent from the morbid specimens examined by MM. Huguier, Bernütz, Cruveilhier, and myself, that there is no descent of the anterior part of the rectum; but the tumor is formed solely by the peritoneum, and this condition, with the softening of the pelvic tissues, sufficiently explains it.

If the anterior part of the rectum has prolapsed, then there could not be any retroflexion externally; if the anterior portion of the rectum was not prolapsed, but simply the peritoneum, then the body of the uterus, which is generally large and retroflexed, and the long slender cervix, will press the posterior part of the vagina against the rectum, and prevent the rectum or the intestines from coming down. The same would be the case if the uterus is prolapsed, and retroflexed externally. (See Fig. 7.)

DIAGNOSIS.—In diagnosis we have to distinguish between the true and the simulated prolapsus. The differential diagnosis respecting other diseases I shall exclude. In the investigation of these cases we depend in a great measure upon the sound. It was the use of the hysterotome that led M. Huguier to the discovery of this form of *procidencia uteri*. The sound has, as we have seen, been resorted to before by Morgagni and Levret. The presence of a part, or the whole uterus, may be confounded with or mistaken for true and simple prolapsus. In the ordinary or true descent of the womb, the depth will be two and a half to two and three-quarter inches. In the elongation of the cervix, the sound penetrates twelve, fourteen, or even twenty centimetres, i. e., three and a half, four and a half, or six inches.

The sound also permits us to ascertain the direction of the axis of the uterus, and its relation to the pelvis; whether the

fundus remain in the normal position in the pelvis, or above the superior strait, and floating in the abdomen; whether the body is retroflexed internally, or whether the whole uterus is procident and retroflexed. It is requisite that care and caution should be exercised in the examination of these cases. Aran, as well as others, has suggested that a flexible sound should be substituted for the metallic one, or, as some prefer, a very slender, flexible metallic sound. The reason alleged for its use is, that the structure of the uterus has undergone the modification of softening, and the metallic one might perforate the parietes of the uterus. This fear I believe to be groundless. The ordinary instrument was found preferable in my investigations, and passes without any liability of being arrested by, or coming in contact with, any of the folds of the mucous membrane in the cervix, or the curvature of the cervix itself, if retroflexion exists. It is more distinctly felt in the cervix uteri by the vaginal-rectal or double touch.

Force or harsh treatment is to be condemned; gentleness and tact, slight and easy movement of the instrument, will succeed. The sensation communicated to the fingers when it has reached the fundus is easily recognized. Softening of the uterus in excess, in these cases, is not by any means frequent. It may be, and is in some instances, quite flabby in cases a few weeks after gestation, or in those cases, which occasionally are seen, called the *squatty* uterus, and to which Dr. Rigby invited the attention of the profession a few years since, and which are not infrequent. These cases are also sometimes observed in young women, and the uterus will then measure three and a half to four inches, after amenorrhœa of three or four months' duration.

More generally the tissue of the womb preserves its natural firmness. I have not seen, in any of my cases where the sound was used, an endometritis or a cellulitis follow, though I use it to ascertain the partial inflammation of the body of that organ.

In the 76 cases which have come under my notice, including three *post-mortem* specimens, of prolapsus or procidentia uteri, during the last eight years, the following is the result:

Of 76 cases, with 29 operations, 26 were successful.

In 48 cases the uterus was hypertrophied, measuring $3\frac{1}{2}$ to $4\frac{1}{2}$ inches—45 of these were the result of non-involution—of this number, there were 8 operations by amputation of the cervix, and 4 with episio-perineoraphy.

In 8 cases there was retroflexion externally, with the cervix in part or wholly everted. In 3, the measurement was $1\frac{1}{2}$ inches to 2 inches. In 4, from $4\frac{1}{2}$ to $5\frac{1}{2}$ inches. The 4 cases were operated upon, and the perineum closed.

In 15 cases, there was true elongation or so-called hypertrophy of the supra-vaginal portion of the cervix, with the fundus in the normal position, or the body retroflexed either internally or externally. In these 15 cases there were 13 operations by amputation and perineal closures; 3 cases were observed in gestation, 1 at three months, 2 at three months and a half. In these cases the uterus measured $9\frac{1}{2}$, $10\frac{1}{2}$, and 11 inches in length.

In 3 cases, there was true simple procidentia, $2\frac{1}{4}$ to $2\frac{1}{2}$ inches.

From this investigation, can we believe it is true, as M. Huguier has stated, that the rarity of true procidentia uteri without any elongation is in the ratio of 1 to 32?

If we count the cases wholly procident—with the 3 cases also completely external, with retroflexion, making 6 cases—we shall have (including the 3 morbid specimens) the proportion as 1 to $12\frac{5}{6}$, instead of 1 to 32 cases. I believe this experience will be found to correspond with the experience of those who may have given this disease their attention. M. Huguier cites but one case of retroflexion of the uterus externally, out of the 64 cases. Dr. Sims says he has met with only a very few cases of this character, and remarks that, “if the body of the uterus passes out of the pelvis, there is no supra-vaginal elongation.” This opinion, from my experience, is not established.

Independently of the sound, other means of exploration are adopted; the vaginal and rectal touch is most important. The double touch is highly necessary where one finger is in-

troduced into the rectum, and the thumb into the vagina, and then grasping the cervix. In simple procidentia without elongation, the double touch recognizes clearly the fundus uteri, and also that no body or substance intervenes between the fingers. On the introduction of the sound, the end of it will be perceived at the fundus externally. The same method of grasping the uterus, when retroflexion exists, will be amply sufficient to satisfy our minds in this case. In the supra-vaginal elongation of the cervix, the vaginal examination recognizes the long, cylindrical neck, which is confirmed by the rectal touch. The double touch recognizes the same, and the cylindrical tube may be felt and grasped, and moved about in the pelvis. If the fundus is in the normal position, it cannot easily be felt, unless the sound is used, when it may be found by external abdominal examination, even with the superior strait, or sometimes above it, while the cervix is external. This, however, is not by any means according to my experience; for the uterus is generally retroflexed, the cervix being from 1 to 2 inches external. The vaginal and rectal touch will recognize the end of the sound at the fundus of the uterus; and the uterus may, sometimes, then be raised to the superior strait, provided no peritoneal adhesions exist, or that it is not prevented by some mechanical cause. Without these investigations, the presence of a part, or the whole uterus, may be mistaken for a true elongated hypertrophied cervix. In the complete falling, the fundus is on a level with the vulva, or just within the labia. It is at this point, I think, we may explain how the prolapse occurs in these cases. The simple prolapse has been compared to an ordinary hernia. The womb represents the intestine, the suspensory ligaments the mesentery; the perinæum is considered as the abdominal parietes, the vulvo-vaginal canal as the ring. When, therefore, the suspensory ligaments are relaxed, the uterus pushes incessantly as a wedge against the perinæum, glides by it, dilates the vagina, and passes out of the vulva.

If the vagina is very much relaxed, or the perinæum ruptured, the suspensory ligaments resist for a time, but eventually the uterus, which was retroflexed internally, passes out and becomes doubled up or retroflexed externally. In the simple

prolapse, the reduction of the organ is easy ; congested by too long a procidence, it will become painful, and sometimes a slight gurgling is heard from the intestines wedged in the posterior peritoneal cul-de-sac. When the uterus is returned into the pelvic cavity, it becomes retroverted. There is difficulty sometimes in reducing the uterus with elongation of the cervix, if of long standing, especially if retroflexed externally ; and, when returned, it will become doubled up. Should there be any sensitiveness of the cervix or the whole uterus, it is better to overcome this irritation before reduction.

It is evident that the disease or affection first suggested by Levret was entirely overlooked or forgotten by nearly all gynecologists down to the present time, until it was first referred to by Cruveilhier, and ably and fully presented by M. Huguier lately, and now demands the attention of the medical profession.

Aran considers that this elongation is only *apparent*, and that after he had measured, in some cases, the same uterus attentively before and after the reduction of the prolapsus, it was less than when it had been prolapsed. If so, the elongation was consequent upon the prolapsus, which may be recognized in some cases. Kiwisch has also alluded to the same circumstance, and remarks, that, "if the uterus, which measured $4\frac{1}{2}$ to 5 inches when the cervix was external, was returned, the uterus would only measure 3 inches." The observations of Aran and Kiwisch show the ductility of the uterus, but the nature of the affection remains the same. They have, however, I think, not fully recognized the true nature of the case. The uterus becomes retroflexed when fully returned, and if it measured from 4 to 5 inches before reduction and 3 inches after reduction, it will, if the organ is elevated (when wholly returned) to the superior strait, measure the same as before it was reduced. The falsity of the measurement is owing to the curvature at the neck, for it is doubled upon itself, retroflexed. The general measurements of M. Huguier's cases, out of the sixty-four, according to his own statement, were $3\frac{3}{4}$ inches. As my attention for many years has been given to this subject, I have measured not only the procident uterus, but the uteri of those who have had chil-

dren, and were not complaining of any symptom of prolapsus:

1. In those women who have been recently confined.
2. After two or three years' confinement.
3. After the cessation of the menses.
4. In many cases for so-called chronic inflammation.

In a large number of the cases the uterus was found from $3\frac{1}{2}$ to 4 inches—the majority $3\frac{1}{2}$ inches. I believe it will be ascertained that this is a more correct estimate of the size of the uterus in women who have had infants, than the usually recognized standard of $2\frac{1}{2}$ or $2\frac{3}{4}$ inches in the living subject.

The different appearances of the forms of uterus, prolapse with descent of the body, and prolapse without sinking of the body (Virchow, Huguier), have been dwelt upon under the pathological observations, and need not be referred to again.

TREATMENT.—In order to the correct and rational surgical treatment of procidentia uteri, it is necessary for us to fix on the exact nature of the pathological lesions which constitute, or which give rise to it. From the preceding reviews of the pathology of this affection, it is apparent that we have two varieties, namely—simple prolapsus without hypertrophy, which is rare, and prolapsus with or without hypertrophy and elongation of the supra-vaginal portion.

To the last variety, our attention is especially directed. The cause is inherent in the uterus itself. The increase of its length may be in the cervix, or cervix and body together, or more generally in the *intermediate* part or isthmus. All cases connected with polypi, ascites, ovarian tumors, or the simple prolapse, with or without retroflexion, as I have stated above, are excluded in the consideration of the present subject. Generally three indications are to be fulfilled in simulated procidentia uteri:

1. To replace the uterus in the vagina, and retain it, by the T bandages or with the abdominal truss.
2. To maintain the uterus in its place by tentative means or appliances, such as the various forms of pessaries, vaginal or intra-uterine.
3. To maintain the uterus in a permanent manner, or by the radical cure.

It is the third method which I propose to consider, i. e., the radical cure.

Before referring to the surgical treatment which I prefer adopting and advocate, I desire to pass in review the different methods which have been resorted to, as wrong impressions and some confusion exist respecting them, as they are considered or spoken of at the present day.

The operations practised, with the intention of mechanically preventing the descent of the womb, are the following: 1. Infibulation. 2. Episioraphy. 3. Episio-perineoraphy. 4. Elytroraphy, Anterior and Posterior. 5. Elytro-Episioraphy. 6. Amputation of the cervix uteri, with or without a removal of the supra-vaginal portion of the cervix, conoidal in shape, as recommended by M. Huguier.

Infibulation consists in the union of the labia majora. Schaeffer, in 1856, practised this method, and was perfectly successful. Afterward Klein adopted it, but, instead of using *one* suture for the operation, substituted two. In his case the uterine cervix passed through the inferior part of the vulva, and was wounded by the suture. The operation did not succeed. Aran has lately proposed this operation, and practised it four times. In one case, the accident that befell Klein happened to Aran—the suture passed through the cervix uteri, which had escaped below, and was strangled. The other cases did not succeed. This method of relieving prolapsus has not been very successful, and cannot be, except by completely infibulating the whole vulva.

2. *Episioraphy* was first suggested by Fricke, of Hamburg, in 1833, who operated by removing portions of the mucous membrane $\frac{3}{4}$ to 1 inch from the edge of the labia, and carried it down to the frænum, so that a portion of the labia an inch in breadth is removed, and the same repeated on the other side. The edges are then brought together by ten or twelve stitches. This operation was adopted by Velpeau, also by Seanzoni, Roux, and by Stoltz.

3. *Episio-perineoraphy*. This is a modification of the former operation. It is the extension of the incisions on the perinæum, so as to give a greater resistance to the parts on which the prolapsus acts, and to correct the relaxation of the

tissues of the perineum, or to remedy the rupture, if any exist. This mixed method has been employed by Stoltz, of Strasburg. The credit of introducing it is due to J. Baker Brown, of London, who popularized the operation. The success of this method of operation, whether for prolapsus uteri in some instances, or for ruptured perineum, or for true vaginal rectocele, is, I believe, complete. Where care in denudation of the mucous membrane has been observed, and the parts are nicely adjusted, reunion of the parts, as a general rule, is seldom wanting. There is little or no risk in the operation. Since J. Baker Brown's method was presented to the profession, various modifications in respect to the form of the denudation of the mucous membrane, or the kind of clamps or bars or the tying of the sutures, with their different adjustments, have been made. The exceptional cases are those of a syphilitic nature, or strumous diathesis. Geddings, Savage, May, Gamgee, Teale, Malgaigne, and others, have performed it. Hilton, in 1854, before the operation, preferred dividing the sphincter ani; and Oldham, in 1857, adopted the same views, with complete success.

4. *Elytroraphy, Anterior or Posterior.* Gerardin proposed to remove a slip from the circumference of the vaginal mucous membrane of an inch in diameter near the os uteri, when the uterus was external, and afterward to return it into the vagina, and allow it to heal up by granulation, and thus produce contraction of the vagina at the superior part. The name of ELYTRORAPHY was given to this method of operation by M. Berard, Jr. There has been much controversy in regard to the origin of this operation. Velpeau, in a clinical lecture, says: "The first idea of this operation is due to Gerardin, who described it in a memoir which he presented to the Société de Médecine de Metz or Nancy, which, however, was never published. He proposed to *contract* the vagina, and, if necessary, even to obliterate it in women who have ceased to menstruate. In his letter to the Academy, he says that before 1823 he had proved that the pessary might be replaced by and the cure of prolapsed womb *radically* effected by a surgical operation," which is stated above. It is, therefore, possible that Marshall Hall might have

been aware of Gerardin's suggestions before he proposed his operation, which was performed by Heming, November 19, 1831. If Dr. Hall derived any benefit from Gerardin's suggestion, his operation was different in its locality, and the method of producing a contraction of the vagina. The credit is usually conceded to Dr. Hall for his method of operation. A mistake exists in the minds of the profession, respecting the form or shape of the portion he had removed from the mucous membrane of the vagina. It is generally spoken of as elliptical. This is not as it is described by Dr. Hall himself, in the *London Medical Gazette*, vol. ix., page 269. He says: "The uterus being protruded as much as possible by the efforts of the patient, *two parallel incisions* were made through the mucous membrane from the sides of the os uteri, along the course of the protruded vagina to the os externum; the portion of this membrane situated between these incisions was then removed, leaving a space of $1\frac{1}{2}$ inches in breadth, and of the entire length of the vagina, completely denuded. A suture was then inserted *near the os uteri*. This suture being tightened, the os uteri was pushed upward; a second, and a third, and others were inserted in the same manner, at short intervals, to the os externum." From this description it appears that the form of the part of mucous membrane removed was of a *parallelogram*, and *not*, as it has been supposed, *elliptical*. The case was successful, and remained so when examined several years afterward.

The *elliptical* shape for denudation belongs to Dr. Ireland, of Dublin, who, in November, 1834, operated for procidentia uteri. The operation of Dr. Hall was modified by "dissecting a slip of the mucous membrane from the lateral portion of the vagina, about $1\frac{1}{2}$ inches wide, extending the whole length of the tumor, from the os uteri to the os externum. The incisions were parallel, except at the commencement and termination of each other, where they suddenly converged, leaving an intermediate portion of the vagina free." Dr. Ireland preferred this method, because it was more safe than Dr. Hall's, as the operation would be performed between the rectum and bladder. Dr. Irving, of Dublin, also adopted this modification in his case in 1834. Both operations were successful.

In August, 1835, Velpeau modified Drs. Hall and Ireland's operation, and reported to the Académie Royale de Médecine a case in a woman about fifty years of age. He removed three strips of mucous membrane from the vagina, one anterior and two lateral; each of them was 10 lines, or $\frac{5}{8}$ of an inch wide, and the whole length of the vagina. "The woman had been cured for two months" when last seen. M. Maingault objected to the operation, as it would prevent the female from becoming a mother, and would entail serious inconvenience in case of accouchement. M. Velpeau, in reply to this objection, remarked, that "there existed facts which tended to prove that the cicatrices of the vagina will yield sufficiently to permit the passage of the fœtus."

At the same session of the Académie, M. Berard, Jr., presented a woman on whom he had practised the operation of Dr. Hall with full success. In the cases of three females operated on by him, two had been radically cured.* All these cases were treated by the silk suture.

But, prior to all these cases, Dr. J. F. South, of London, as far back as 1832,† operated for prolapse of the bladder, with procidentia uteri, and removed an elliptical portion of the vagina, extending within $\frac{1}{2}$ an inch of the os uteri, and down to the os externum, using the metallic sutures (platina). The operation was not successful the first time, but the second operation was. In this instance, the position of the patient to be operated upon was standing, with her body bent at right angles, with her legs and arms resting upon a table, and the pelvis higher than the shoulders. A pewter speculum, slit lengthwise, and the edges widened, was introduced into the vagina, with the gap in front; the labia held apart by the assistants, and the perinæum *pressed up* with the speculum; the same method of excising portions of the mucous membrane as in the first operation. Patient did well this time.

After an interval of several years, in 1856, Dr. Marion Sims operated on a case of procidentia uteri, and, to quote his own words "*seriously proposed* to this lady to make a complete *vesico-vaginal fistula* by *removing* at once, as

* *Archives Générales de Médecine*, tome viii., 2d series, page 515.

† Chelius's Surgery. Edited by Dr. South.

it were, a large portion of the base of the bladder, with the anterior wall of the vagina. The portion removed measured $2\frac{1}{2}$ inches transversely, by $2\frac{5}{8}$ inches longitudinally. The chasm was fearful." He further says, "his *surprise* was equalled only by his *delight* that he had not succeeded in doing what he intended." The portion denuded, or rather excised, was of an elliptical shape, the same as Dr. Ireland's, and having no intermediate healthy tissue. Two years afterward, in 1858, Dr. Sims modified his former method, and adopted a V shape, leaving the intermediate space free between the two slips of mucous membrane removed, and not completing the elliptical shape. The denuded surfaces were brought together by metallic sutures (silver).

On July 5, 1861, Dr. Roberts, of Dublin, in a case of procidentia uteri, modified Hall and Ireland's operation, and substituted the *triangular* shape, "by dissecting a slip of the mucous membrane covering the posterior surface of the uterus, brought the edges together by metallic sutures, and removed a similar piece from the anterior surface, and drew the edges together in the same manner, and performed afterward the operation for lacerated perinaeum. Patient did well." (*Dublin Journal of Medical Sciences*, vol. xxxii.)

In 1865, Dr. Emmet modified the operation of Dr. Sims of the V shape, by making it a *triangle*, the same form as Dr. Roberts's, but with an intermediate space of *healthy* tissue. The triangle shape was suggested to Dr. Emmet, as he recognized in some of his own patients and those of Dr. Sims, that had been operated upon, the uterus was retroverted, and the cervix caught in the base of the V shape, suggested by Dr. Sims. It appears that the several operations which I have referred to, where the silk ligature was used, up to 1835, and others, where the metallic ligature was adopted, were perfectly successful. My friend, Dr. Sims, however, entertains a different view, and says, in his "Clinical Notes on Uterine Surgery," "I do not think the operation ever succeeded till my own day," and this success is due wholly to metallic sutures.

The operation on the vagina, by caustics, lately resorted to

in some cases, by Dr. Routh, of London, has not claimed much attention from the profession. From this *résumé* of the various operations on the vagina, we find that the principal operations at the present day, for procidentia uteri, are: 1. Episio-perineoraphy; 2. Elytroraphy, anterior or posterior, or both at the same time (Dr. Roberts); and, 3. Amputation of the cervix uteri by different methods. Having already dwelt upon the former, my remarks in the few following pages will be addressed to the subject of the amputation of the cervix uteri for this affliction. The cases which M. Huguier considers as contraindicating the operation are: "too large a pelvis; too large a vulval opening; a perinaeum more or less relaxed or ruptured; a considerable relaxation of all the soft parts that form the floor of the pelvis, or where the body of the uterus is completely without the excavation, or retroflexed in such a manner that the fundus of the organ is lower than the cervix, and do not permit us to hope for success." The cases which have presented themselves for my consideration were many of them of long standing, varying from one to thirty years, and in whom, according to M. Huguier's views, an operation was contraindicated. Some of these cases will be represented by diagrams.

Previous, however, to M. Huguier's suggestions for removal of the cervix uteri for procidentia uteri, Professor Chaumet, in 1845, recommended the following method: 1. Remove a portion of the vagina, as advised by Dr. Hall and performed by Gerardin, Laugier, Professors Velpeau and Berard, Jr.; 2. Amputate the whole or part of the cervix uteri. In the case operated on by Professor Chaumet, the result was in every respect satisfactory: although eight months had elapsed, and the woman had been occupied in the most laborious duties, she remained cured.

Lisfranc gave more currency to the propriety of the amputation of the cervix uteri for diseases of the uterus than any previous surgeon on the Continent, but it was generally for large hypertrophy of the infra-vaginal portion of the cervix. The opinions of several of the more recent gynecologists, such as Becquerel, Nonat, Hodge, and others, give but little, if any, sanction to this method of operation, through mistaken views

as to its value. As no description of M. Huguier's operation has been given by any American authority, I shall be excused for presenting it before I pass to the relations of other methods for amputation of the cervix uteri, according to the nature of the case.

This operation consists in the removal from the superior extremity of the vagina of a portion, or the *totalité*, of the cervix from without inward, after having previously separated the bladder from the part which is to be removed. This has been termed the "conoidal amputation of the cervix uteri." The object of the operation is not only to amputate the supravaginal portion of the cervix, but to remove some, or a considerable portion, of the *supra-vaginal part*, which is the seat of the *hypertrophy*. The difficulties consist in the necessity of avoiding the posterior peritoneal folds, and the bladder in front, dangers from hemorrhage during or after the operation, and the consecutive inflammation, perimetritis.

Previous to the operation, M. Huguier gives special attention to the welfare of his patients, which consists in producing an eruption, by croton oil being freely rubbed on the thighs, legs, and flanks, and which is done from fifteen to twenty days before the operation, for fear of peritoneal inflammation. The patient is placed in the usual position for diseases of the uterus, on the back, and the procedure of the operation is as follows:

1. "The first step consists in the section of the posterior part of the vagina and neck. The danger is the lesion of the peritonæum. To avoid this, the surgeon introduces his index-finger of the left hand into the rectum, and places it in contact with the anterior part of the intestine. The finger indicates to the eye the limit of the recto-vaginal fold of the peritonæum, and serves as a guide during the whole of the operation. Incising on the finger the portion of the vagina which is inserted on the neck, during which incision the cervix is seized by an assistant with the Museaux forceps in the posterior lip of the os tincæ; then directing the incision toward the cavity of the neck, to avoid the peritonæum, through the thickness of the uterine tissue, obliquely from below upward, and from without inward, as far as it has reached the cervical cavity.

"The second step of the operation consists in the removal of the anterior section of the cervix. The danger to be incurred here is cutting into the bladder. To arrive at this, he introduces into this organ a sound, directing it below, toward the inferior part of the vesical cul-de-sac, which forms at the anterior part of the tumor. It is then given to an assistant. The anterior part of the cervix is seized by the Museaux forceps, and depressed by the assistant. An incision is made about four lines from the end of the sound, of a horizontal and semi-lunar shape, from the superior convexity, which embraces the anterior part of the cervix, and the extremities join those of the first incision posteriorly. We then separate, by a careful dissection, the bladder from the anterior part of the cervix, in a space from three-quarters of an inch to an inch at most, after which we divide the anterior part of the neck obliquely from above, below, and from below upward, reaching the cervical cavity near the posterior incision.

"The part removed has the form of a cone of which the base is the os tincæ. To avoid the hæmorrhage which follows the operation, it is necessary sometimes to tie the arteries. To prevent the uterus from ascending after the operation, a tenaculum is inserted in the posterior part of the cervix. It is with difficulty the arteries can be secured in the uterine tissue, as it is so dense and friable that the ligatures do not hold the arteries. M. Huguier, for this purpose, has invented a procedure to secure them. It is a strong curved hook, resembling a fish-hook, at the head of which is a ligature, and the ligature is then passed over the artery, and tied. Besides this means of operating, instead of removing the part by the scissors or scalpel, the *écraseur* may be employed, as was accomplished by Chassaignac in 6 cases. This cannot be applied till the anterior and posterior parts are separated; even then the conical shape cannot be given to it. The *écraseur* is valuable where there is a vascular neck, or a very large hypertrophied os uteri.

"Should the ligatures not succeed in their application, then the actual cautery, or the persulphate of iron, to arrest the hæmorrhage, should be used. The portion excised being removed, we return the uterus into the pelvis. On the part

excised, a mesh of lint covered with cerate is placed, and this is maintained in position. The cicatrization is complete in from 20 to 30 days. The superior extremity of the vagina is thus contracted or gathered up, and presents a reddish cicatrix, about three-quarters of an inch, at the bottom of which we perceive a small transverse opening. The womb diminishes, in *two or three* months, in volume, independent of the portion which is removed, reducing the uterus nearly two inches in its length."

M. Huguier does not perform any operation on the perineum, as he has given the contraindications for his operation; and the ruptured or relaxed perineum was one of these contraindications.

I have stated above that the very cases M. Huguier has objected to are the kind of cases which have claimed my attention, and, therefore, deemed that the operation for episio-perineoraphy should be performed. If these cases, as M. Huguier considers, contraindicate the operation of amputation of the cervix for procidentia uteri, what operation, may I ask, would be of any value or benefit to the patient? Certainly, elytroraphy, anterior or posterior, with any of the modifications which have been suggested, would not, I think, be likely to succeed. In the cases I have described, if the fundus reaches, or remains in, the normal position, then the elytroraphic operation would either raise the fundus uteri two or three inches above the superior strait, or, if not thus elevated, it will assume the retroverted or retroflexed position. This occurred in several of the cases of Dr. Sims, and was recognized by Dr. Emmet, a few years afterward, by the cervix engaging in the base of the V-shaped pouch which Dr. Sims had adopted. Hence, the V shape was modified to a perfect triangle by having the base made complete. With even this alteration, I am impressed with the idea that it will not prevent the womb from becoming retroverted or retroflexed, if there is the elongation of the supra-vaginal portion, as I have demonstrated. Possibly, I may be mistaken in regard to the kind of cases this operation or method is to be performed upon, as there is nothing definitely stated, either by Dr. Sims or Emmet, as to what kind of hypertrophy it was. Should

we judge from what Dr. Emmet says in the concluding remarks he makes in his essay on procidentia uteri, we might be enabled to conclude they were *not* cases of elongation. Dr. Emmet says "his method should be resorted to, when the uterus has become hypertrophied, and before it has remained outside of the vagina for years unreduced; before the vagina has lost entirely its contractile power, through the usual systematic course of stretching by pessaries, each from necessity being larger than the previous one in use."

It is more particularly in the exceptional cases, as adduced by Huguier, that I have resorted to the operation of amputation of the cervix uteri for procidentia uteri. I am so convinced on this point, that it is difficult to believe, nor do I see that, any other form of operation for *simulated* prolapsus could be as successful, unless the special objects, which are to be obtained from the amputation, ensue: 1st, a modification in the size and weight of the uterus; 2d, a decrease of the hypertrophy or elongation—first, by the loss of blood which will necessarily follow the operation, sometimes greater, and sometimes less, and, second, by the suppuration which will take place—and 3d, the contraction or lessening of the remaining portion of the cervix.

It is not only in the cases of longitudinal hypertrophy, or elongation of the cervix, that the amputation of the cervix will be necessary, but in cases sometimes of an eccentric character. Dr. Sims incidentally refers to the kind of cases which M. Huguier has described, and remarks upon the objects of the operation for amputation: "I amputate the cervix *only* when its lower segment is too large, or too long, and projects so far into the vagina as to present a mechanical obstacle to the retention of the uterus *in situ*, when replaced" (p. 302). In other words, he only operates for hypertrophy or elongation of the infra-vaginal portion of the cervix.

Dr. Sims, in a short paper on "Amputation of the Cervix Uteri" (*Transactions Med. Society, State of New York*, 1861), after performing the operation of M. Huguier, by removing a conical portion of the cervix, for great engorgement and hypertrophy of the cervix with granular os uteri, remarks: "This mode of operation should not be imitated, for

the cicatrization of the wound almost obliterated the cervical canal."

In regard to the treatment of these cases by amputation of the cervix uteri, for their radical cure, or for the greater comfort of the patient, I have been guided by the nature of the case requiring the operation :

1. If there was a uterus with a procidentia, with elongation, having a short anterior and posterior infra-vaginal portion, with no eversion or decided hypertrophy of the cervix, Huguier's operation was adopted, by removing a conical portion of the cervix, though in a different manner from that of M. Huguier, which will be referred to shortly.

2. When there was infra-vaginal hypertrophy, more than ordinary with elongation, the simple circular amputation was resorted to, sometimes by the scalpel, sometimes by the *écraseur* (double chain or the twisted wire), but more generally by the scissors. Previously, however, to using the *écraseur*, the mucous membrane was divided completely around the cervix, to prevent the drawing in of the mucous membrane into the chain of the instrument, and thus avoiding the possibility of lacerating the peritonæum.

3. When the cervix was everted in part or in *totalité*, I then performed the operation which is described in case 4, and illustrated in the diagram accompanying it. (Fig. 7.)

4. Should the anterior and posterior labia of the cervix be somewhat elongated and hypertrophied, even with eversion, or without eversion, and the body of the uterus large, I have performed what I shall call the "double-flap operation" (see Case 4, Am. G.). In this operation, there will be but little, if any, contraction of the cervical canal. It leaves the appearance of the cervix as nearly natural as it could well be (see Fig. 11). After the operation, episio-perineoraphy is performed, for a more perfect restoration of the uterus internally, and for a more successful issue.

Dr. Sims, in the ordinary hypertrophy of the infra-vaginal portion of the cervix, excises the cervix by first slitting it laterally, nearly to the junction of the mucous membrane of the vagina with the neck, and then separates the anterior lip first, and afterward the posterior half; then he brings the mu-

cous membrane of the vagina, which covers its anterior part, to join the posterior part, and unites them by three or four metallic sutures, to produce union by the first intention. I do not perceive that there is any more guarantee in this modification or method from contraction of the cervical canal than by the simple circular amputation. "In all three of the cases" he had operated on by this new method, he says, "menstruation has been easy since the operation, although the os was smaller than natural; but in *each case* I enlarged the opening a little by slight incisions."

The perineal operation might be objected to after the amputation of the cervix, because it may be supposed that, after the removal of the cervix, the uterus will ascend in the pelvis more nearly to its natural position. This is not true respecting the cases I have referred to, but it remains in the pelvis for a short time, until it becomes more reduced in size and length; it then begins to take its natural position. I believe that the perineal operation is *absolutely* necessary; for, if it does not positively *cure* the dilatation of the rectum, or prevent the procidence of the recto-vaginal wall from becoming prolapsed, it will, in time, return to a more natural condition.

The dilatation of the posterior part of the vagina, or the rectum, is not the principal complaint, but only takes place from mechanical causes, in consequence of the loss of support in the pelvic floor. When this support is again supplied, the prolapse of this portion of the vagina, or rectum, will gradually disappear, or, at any rate, is so much lessened as to be of no practical inconvenience. In some cases, where I have had an opportunity of examining after the lapse of some years, and in one case, which I saw in March, 1868, there was not any portion which was found external. The protrusion is not likely to be reproduced unless the womb should become again affected. I have had two instances, where the patients have removed the clamp suture, and then I have substituted the cobbler's stitch for the usual suture, which will be described. I have performed the operation for episio-perineoraphy a great many times for different purposes, and in very few instances has the operation failed. The failure has been in consequence

of a syphilitic hypertrophy of the parts grafted on a syphilitic constitution. From experience, and the very nature of most of these operations, as referred to, and the character of the affection, it is not to be expected that success will result in all. There must be failures, and there will be failures. Yet success will be obtained in a very large number of cases. The operation, by amputation of the cervix, as resorted to by M. Huguier, appears to be rather a formidable one, on account of his removing so large a conical portion from the cervix, as he dissects the bladder and the rectum from their attachments to the uterus, and especially where the lower and upper branches of the uterine arteries course. It is for this reason that severe hæmorrhage may follow, or a perimetritis occur. I do not think it necessary to resort to so extensive a removal of the cervix as M. Huguier, nor could it be extended farther up the cervical canal than the glandular part, as the portion above this is so very narrow, as I have shown.

With the different methods I have followed, according to the nature of the case, I do not believe there is any fear of such a severe hæmorrhage, nor risk of a perimetritis or cellulitis, as I have never met with them, and I think the operation *perfectly simple and safe*. I have not considered it requisite to prepare the patient for the operation, as M. Huguier suggests. In fact, with rest for a day or two, and the bowels evacuated previously to the operation, is all that is necessary. After the operation, the part excised is treated by water or sedative applications during the day occasionally, and the T bandage. In a few hours, or a day or two, the uterus recedes into the vagina, and sometimes at once, and gradually begins to diminish in length, and in the course of a few days will ascend to the natural axis in the pelvis, measuring $2\frac{1}{2}$ inches. After this occurs, the operation of closing the perinæum is resorted to in two or three weeks, the uterus retaining its natural position.

CASE IV.—*Complete procidentia uteri of ten years, with retroflexion externally; elongation of the supra-vaginal portion; complete eversion of the infra-vaginal portion; complete rupture of the perinæum; amputation of the cervix*

uteri. Double-flap operation. Failure of the clamp suture for the perinæum. Successful restoration of the perinæum by the cobbler's stitch. Reported by Dr. EVERETT, House-Physician.

Ann G—, aged twenty-eight years, was admitted into Bellevue Hospital October 7, 1864, for procidentia uteri. Is the mother of two children; the first was born at full term, the second was a miscarriage, at five or six months. She has suffered from procidentia since the birth of her first child, ten years ago. On examining the vulva, the uterus was procident,

Fig. 7. 7



TWO-THIRDS NATURAL SIZE.

A. Internal orifice. B. Internal part of the cervix uteri. C. External orifice or os tincæ. D. Fundus uteri.

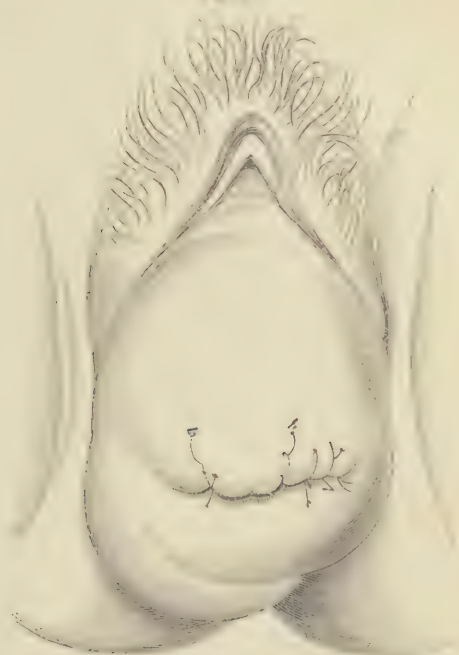
with complete retroflexion externally. The cervix was discovered very large, and totally everted, measuring three and a half inches in diameter, presenting a bluish-red appearance; the large globular substance hanging down was recognized as the

fundus and body of the uterus. The rectal touch could feel nothing of a uterus in the pelvic cavity, and the sound introduced into the bladder could be felt when the end was turned to the rectum. The sound introduced into the uterus gave a measurement of $5\frac{1}{2}$ inches, while in the retroflexed condition externally. When the uterus was replaced in the pelvic cavity, and the sound passed into the uterus, the length was six inches, and the fundus could be felt at the superior strait. There was only a slight cystocele; but no rectocele of any moment, for the fundus occupied the posterior cul-de-sac externally. As no tentative treatment, either by the various kinds of pessaries would be of any permanent value—or even the electrolytic operation—the only resource left, I believed, was the amputation of the cervix uteri, and the restoration of the perinæum.

After the patient had been in the hospital a month, November, 1864, the double-flap operation, as I have termed it, was performed in the presence of a large number of medical gentlemen and students. The first step was to return the body of the uterus into the pelvic cavity, the cervix remaining external; next, to reinvert the cervix uteri; then divide the right and left side of the cervix laterally, half to three-quarters of an inch ABOVE the union of the vaginal cul-de-sac. After this, transfix the posterior labia of the cervix, commencing at the summit of the division just made laterally, at about two-thirds of the thickness of the labia, then cutting through the whole length of the posterior half of the cervix. The anterior labia was transfixed and divided in the same manner; then removing the posterior upper portion upward and inward *in toto*; afterward the anterior lower part from above downward, leaving the one-third of the thickness of the anterior and posterior labia, having a mucous membrane externally. Thus we remove three-fourths of the cervix above the insertion of the vaginal mucous membrane after the separation of the two-thirds of the cervix uteri in its thickness, and half to three-quarters of an inch above the insertion of the vaginal mucous membrane the anterior labium is doubled up, and the end of the labium reached to the point of the cervix that was separated, and two sutures (metallic, iron or silver) are inserted on each side, and

tied. The posterior is done in a like manner by two sutures on each side. Then the labia which have been doubled up, and united by sutures, are brought in apposition, by two more sutures on each side, and also by one suture in front, to prevent the parts from gaping, and making it more secure. The lateral portions of the cervix are in close union, at the edges, and the two external mucous surfaces of the infra-vaginal portion of the cervix, the anterior and posterior, are in apposition. Union by the first intention takes place, and the artificial os tincæ is now covered by a mucous membrane for three-quarters of an

Fig. 8.



APPEARANCE AFTER OPERATION—HALF NATURAL SIZE.

inch in the cervix, and no perfect closure of the cervix can occur. The cervix was allowed, after the operation, to remain external, and water dressing solely adopted, three or four times a day, the patient removed to her bed, and pills of hyoscyamus or aqueous ext. of opium 1 gr. three times a day. The catheter to be used every four or five hours. No untoward circum-

stances occurred, the inflammation was of a light character, and the sutures were removed on the fifth day, except the one directly in front closing the labia. The operation of episio-perineoraphy was then performed after the uterus was returned into the pelvis, by the ordinary clamp suture, only adopting the parallelogram shape for the removal of the mucous membrane, when the vulva is expanded four inches in length, or two inches on each side, and one and a half inches breadth. Patient returned to bed; water dressing; T bandages; catheter used as usual, and opium or hyoscyamus pills given.

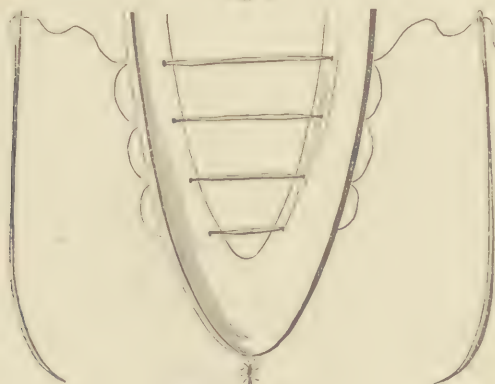
Every thing was progressing favorably; but on the fourth morning the patient removed the clamps. On examination the perinæum appeared closed perfectly, but my fears were, as the union was only recent, the adhesions would give way, and the uterus become again procident. The uterus measured four inches; the patient left the hospital the next day. In July, 1865, eight months afterward, Ann G. returned to the hospital for a second operation on the perinæum, the uterus being prolapsed in part, and measuring four and a half inches in length, and retroverted. The perinæum quite gone, and appeared as it did at the first examination. The same operation for the perinæum was resorted to, and the same circumstances occurred as previously. She removed the sutures on the fourth day. She was then dismissed from the hospital.

In February, 1866, seven months afterward, while I was on duty at the Charity Hospital, she begged to be admitted, and promised faithfully to adhere to every order or direction. As she was *au fait* in removing the suture by the former method of treatment for the perinæum, I proposed another and a different method, which I have called the *cobbler's stitch*. I felt confident she could not remove this suture.

The patient was placed in the usual dorsal position. After chloroform had been administered, and the extremities of the patient sustained by assistants, the right and left labia were denuded by scissors, after the portion of the mucous membrane was marked out of a parallelogram shape, two inches in length on each side, and one inch and three-quarters in breadth. (The uterus had not increased any more in length, but the cervix re-

mained partially external.) The largest number of silver wire, a foot in length, having a large curved needle (see diagram) attached to each end, was used. The suture was introduced at the lower part of the perineum, close to the anus, carried deeply into the labia on the left side, one inch from the edge of the labia, then through the right labia from within, outward, and emerged the same distance from the edge of the labia. The right labia was then pierced from one-quarter to one-third of an inch higher up on the same side, and passed through to the left labia; then the left labia was entered by the suture, in the same place the needle emerged from, and thus every quarter or one-third of an inch the suture was introduced from left to right, and from right to left, until it had reached the commencement of the part that was denuded, making from four to six times. After the parts were sufficiently dry (though it is not necessary to wait for this), the labia were then drawn together, like the cobbler's stitch, not too tightly, but sufficiently so to bring the parts in close apposition. The wire was then tied in front, and four or five small sutures applied on the edge of the labia; water dressing and T bandages moderately applied, and the usual treatment adopted after operations of this nature. This suture

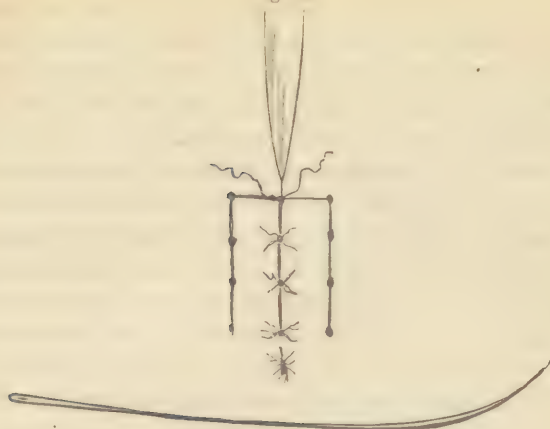
Fig. 9.



COBBLER'S STITCH.

the patient did not comprehend, nor could she possibly remove it. The sutures were removed on the tenth day.

Fig. 10.



AFTER OPERATION.

No untoward circumstances transpired to remove them before. At the time of removal the parts were somewhat cedematous, and the stitches slightly embedded. The water dressings were properly attended to every day, and inflammation was thus prevented. On examination the perinæum was solid and well established, the uterus higher up. The patient was retained in the hospital for six weeks, and the perinæum continued perfect, the uterus measuring from three to three and a quarter inches in length. The diagram gives the appearance of the cervix uteri at that time. The representation was taken by my artist, M. Köhler.

Fig. 11.



NATURAL SIZE.

Remarks.—The principal data of this case were recorded by my House-Physician, Dr. Everett. I was induced to resort

to what I have called the double-flap operation on the cervix uteri for elongation of the supra-vaginal portion of cervix uteri, with eversion of the cervix. I thought by this method we should avoid the peritonæum, posteriorly, and the bladder, anteriorly, if it should descend too low.

2. The *derivative* action might be ample enough to remove the elongation, as the cervix had been reached above the vaginal cul-de-sac. 3. That the contraction (if there was any) of the cervical canal would not be so great when the two external mucous surfaces were brought in contact. 4. That the chances of pregnancy were much greater than by the other methods. I have now operated by this method in four or five instances with success, and I see no reason why it should not be resorted to, where the proper cases present. The hæmorrhage is not as free as it is by M. Hugnier's operation. Sometimes there is very little hæmorrhage, and no vessels require to be secured. I have not seen as much in operations of this form, as I have sometimes for simple division of the cervix in dysmenorrhœa or for sterility. I have made trial of the cobbler's stitch on several occasions, which answers very well, and the operation in some cases can be accomplished in from ten to fifteen minutes. The appearance of the perinæum is as perfect as it possibly can be.

CASE V.—*Procidentia Uteri of ten years' duration ; Elongation of the supra-vaginal portion of the Cervix ; Circular Amputation ; Cure.*

Sarah Jarvis, aged forty-six years, November 2, 1867, presented herself as a patient of the Bureau for Medical and Surgical Relief of the Out-door Poor, Bellevue Hospital. At eighteen years had typhus fever, since which time her menses have never been regular; has had frequent hæmorrhage, sometimes two or three times a month, which was probably owing to small vesicular polypi in the cervix. Her first child, and only one, was born when she was thirty-five years old, and after she had been married five years. She was delivered by forceps. Patient excessively dropsical at the time; she occasionally suffers from pain in the left side, for which she has been treated by various remedies.

On examination the uterus was found procident two inches; cervix not large; a small polypus in the cervical canal. By the vaginal touch the cervix was recognized as being elongated, cord-like, and extending up the vagina from one and a half to two inches. Per rectum the same condition was ascertained. The sound passed five inches and a half to the fundus uteri. The body was retroflexed. No cystocele, but an hypertrophic condition of the anterior part of the vagina, near the urethra. No rectocele. Perinæum perfect and firm. Operation, December 8, 1866. Dr. Taylor, in the presence of Dr. W. T. Lusk, and Dr. S. T. Hubbard, at the residence of the patient, amputated one inch and a half of the cervix, by means of the curved scissors. The neck first being slit laterally above the vaginal cul-de-sac half an inch, the mucous membrane divided around the cervix. The wire-chain *écra-seur* was first tried, but the wire broke, in exercising, from pressure.

There was very free hæmorrhage from an arterial vessel on the left side of the cervix, for which, first torsion, and then the actual cautery was used; and afterward the persulphate of iron. The uterus was replaced in the vagina after the hæmorrhage had ceased. The vagina was then tamponed, as I usually do in all cases for uterine hæmorrhage, by the surgical bandage, one and a half to two inches wide, and packing the vagina completely. It is perfectly simple, promptly introduced, and as promptly removed. The next morning the tampon was removed. No hæmorrhage. Patient to retain the bed for two or three weeks. Catheter used as usual. Sedative treatment, and the tepid-water injection for vagina every day. In two weeks the measurement of the uterus gave from two and three-fourths to three inches. The uterus had attained its normal axis and position in the pelvis. November 14, 1867, nearly one year afterward, Dr. Lusk reports, "Patient called to-day at the Bureau, and says she has been quite well ever since." Uterus natural size, two and a half inches; os uteri not contracted too much; os tincæ slightly abraded. This case is reported by Dr. W. T. Lusk, my attending physician, to the Bureau.

Remarks.—In this case the circular amputation was

adopted. There was more hæmorrhage than ordinary. I do not think it is necessary to adopt the removal of a conical portion of the cervix, as laid down by M. Huguier. The form or method I have adopted is in conformity to the nature of the case. The important and principal object to be obtained from the operation is the *derivative* effect by the removal of a portion of the cervix, and thus a modification in the size and weight, a decrease in its elongation, with or without hypertrophy, by the loss of blood, and next by the suppurative process which follows—sometimes more or less—and the parts to heal up by granulation, occupying about four to five weeks.

The decrease of the affected portion is well illustrated, as is so often noticed in the removal of a large pedicle in the case of *fibro-cellular* or fibrous polypi, although the whole of the base of a pedicle, when large, may occupy some months for its removal. The vitality and the weight of the part are interrupted, in these cases of *proidentia uteri*, by the removal of a portion of the cervix, and a new process instituted for its return to the natural size. It is not to be asserted that the operation will *always* succeed; nor has the operation for the removal of a large pediculated polypi, or a large tonsil. There is a tendency to return in some cases of this nature.

CASE VI.—*Proidentia Uteri, twelve years' duration; Elongation of the supra-vaginal portion; Body of the Uterus retroflected internally, Cervix externally; Amputation of the cervix, by the removal of a conical portion of the neck; Episio-perineoraphy; Cure.* Reported by Dr. EVERETT.

Hannah M., married, aged forty, Ireland, was admitted into Bellevue Hospital November 2, 1864. Has had six children. Had two miscarriages since the birth of the last child. Uterus prolapsed twelve years. She first noticed the tumor after the birth of her first child, which happened before a physician could attend her. It occasioned her very little trouble until about two years ago, since which time it has been getting worse, and pains her considerably at times. Her menses have been regular, except for the last two or three months.

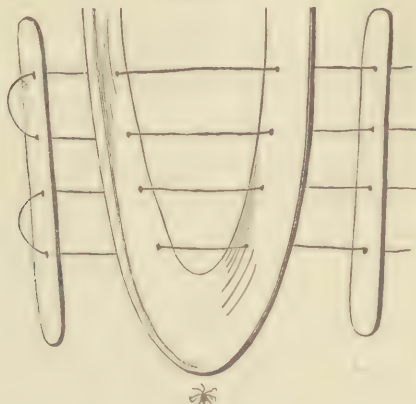
By inspection the uterus appears prolapsed about two and a half inches, and the perinæum entirely gone. The sound gives the length of the uterus as five and a half inches. By the vaginal and rectal examination, the long cord-like feel of the cervix is perceptive, and the sound can be felt through the body of the uterus, which lies in the cavity of the sacrum. There was only partial cystocele and no rectocele.

November 15th.—The amputation of the cervix was performed in the following manner: The cervix was divided laterally one-half to three-quarters of an inch above the vaginal cul-de-sac on each side. The anterior and posterior portions of the cervix were then removed; the anterior, by dividing it downward obliquely and inward to the cervical canal, and the posterior upward obliquely and inward, thus a small conical portion of the cervix was removed. Hæmorrhage was moderate. After the hæmorrhage had ceased, a pledget of cotton was applied, and the surgical bandage, as formerly used in other cases, introduced as a tampon. The next day the tampon was removed, and the vagina washed out with tepid water. Vaginal injections of tepid water every day. Pills of opii, 1 gr., three times a day. On the sixth day episio-perineoraphy was performed, and the clamp suture adopted with the modification of closing the clamps, by Dr. Lane's method. Water dressing; catheterism every day, and sedative treatment. Sutures removed on the fourth morning, and the patient retained in bed for ten days more, when she was allowed to get up. Uterus did not prolapse, and measured only three and a half inches. The body lying in the sacrum when reclining, but assumed the natural position when erect. She remained in the hospital until December 25th, when she was discharged cured. The perinæum firm and solid.

Remarks.—In this case I adopted the modification of uniting the clamps after Dr. James R. Lane's method for ruptured perinæum or vaginal rectocele. Dr. Lane used the ivory bar instead of the lead one. The bar intended for the right side is ready, threaded with two pieces of metallic wire (iron or silver), as represented (see Fig. 12), each piece of wire being looped through the two adjacent holes. This is held by an assistant. The needle, after it has been passed across or through

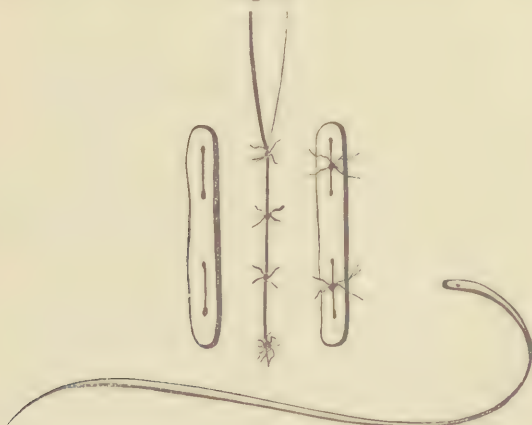
both labia, commencing at the lowest part, is then threaded with the lower one of the four ends of wire, and withdrawn—the same proceeding is adopted for the other ends. The wires

Fig. 12.



are then passed through the second bar, and, being drawn tight, the whole is firmly secured by tying or twisting the ends together, first of the two lower, and then the two upper.

Fig. 13.



AFTER OPERATION.

The method of applying the suture is simple and easy, and as easily and simply removed, by only dividing the two sutures.

It is necessary in many cases of this character of prociden-

tia uteri to have firm support, during the early progress of the treatment, by the clamp suture, as the interrupted suture alone will not meet the nature of the case. I have preferred, in all the operations on the perinaeum, the needle as exhibited in Fig. 13, instead of Mr. Lane's, and I sometimes introduce the four needles before threading them, and then drawing them through at once. I perceive that Dr. Hayes Agnew, of Philadelphia, uses a modification of Mr. Lane's needle, by substituting a movable joint.

CASE VII.—*Procidentia Uteri, four Years' Standing; Elongation of the supra-vaginal Portion of the Cervix Uteri; Elytroraphy twice, afterward circular Amputation of the Cervix; Episio-perineoraphy.* Reported by Dr. EVERETT, House-Physician.

Mary B., aged 26, domestic, native of the United States, has had 6 children; 14 years of age when she was first confined. At that time she had twins. Four years ago last March, 1864, while carrying a tub of water, she was suddenly seized with a severe pain in the lower part of the abdomen, and soon after the uterus prolapsed through the vulva. She commenced flooding, and lost a large quantity of blood, when she came into Bellevue Hospital. In the following autumn, Dr. Emmet, at the suggestion of Dr. Elliot, performed Dr. Sims's operation on the anterior part of the vagina—*anterior elytroraphy*. Five weeks afterward she was discharged as well, and continued so till April, 1865, when she returned to the hospital the same as formerly, when Dr. Elliot performed the same kind of operation; but, after a few weeks, the uterus prolapsed again.

In November, 1866, Dr. Taylor amputated the cervix uteri (simple circular operation). The uterus measured $4\frac{3}{4}$ inches. After removing $1\frac{1}{4}$ inch from the cervix, the uterus was returned into the pelvis, as soon as the hæmorrhage had ceased. T-bandage applied; catheterism 2 or 3 times a day; vaginal injections of tepid water; opium pills, 1 gr., 3 times a day; and rest for 2 or 3 weeks. After four weeks, she requested to be discharged, as she considered herself well. The uterus attained its normal position and axis in the pelvis. No

operation for the perinaeum was then adopted. Seven months afterward, she was seen in the hospital visiting a friend. At that time, the uterus retained its normal position, and she continued regular every month, and was in better health than for several years.

While on duty at the Charity Hospital, Blackwell's Island, in February, 1868, Mary B. entered the hospital a day or two before, and complained of her former difficulty respecting the womb. On inspection, the uterus was prolapsed $1\frac{1}{2}$ inches, slightly sensitive to the touch, and measured 4 inches. In the operation for amputation, 14 months ago, I did not perform the perineal operation, as I supposed the perinaeum, in her case, might be sufficient (although a short one) to retain the uterus if the cervix was removed. I was, however, mistaken. This patient was very hysterical.

February 25, 1868.—I performed the operation of closing the perinaeum before the class, adopting the clamp-suture (Lane's method) of tying the wire. Sutures removed, March 1st, by my house-physician, Dr. Ralph Mead. Perinaeum closed firmly.

March 6th.—Every thing progressing finely.

March 9th.—Perinaeum long, firm, and solid; cervix of uterus, high up, $2\frac{1}{2}$ inches; measurement, 3 inches. Says she feels very well.

April 14th.—Saw Mary B. The uterus measured $2\frac{3}{4}$ inches, and the cervix was $2\frac{1}{2}$ inches from the vulva. In the erect position, the uterus was in its normal position. The perinaeum continued firm and solid. The class was present at the time of examination, and some of the students and the house-staff were permitted to verify the natural relation of the uterus to the pelvis, and the size of the uterus.

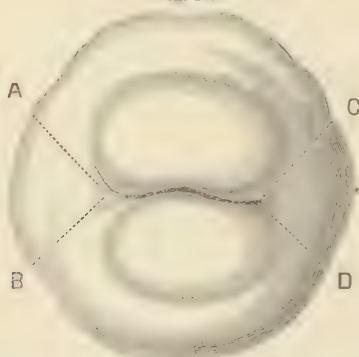
Remarks.—The partial failure of this case, which was from 1 year to 14 months after the operation, was owing, as I believe, to the want of my not forming a new perinaeum, longer than the natural one. It tends to illustrate the opinion I entertain, that, when the cervix is amputated even by any of the methods I have referred to, the operation may not be completely successful, unless the perinaeum is repaired, if lacerated, or if relaxed, and wide, and gaping, and worn away. It be-

comes, I may say, almost a positive necessity, if the uterus has been completely or incompletely prolapsed. I did not consider the case of Mary B. as a perfect case of elongation of the supra-vaginal portion of the cervix, though the examination in February, 1868, gave us the cylindrical cervix, although not long. It is adduced to show that, in some cases, the amputation of the cervix will not succeed perfectly as an operation alone, without the remodelling of the perineum, which is a great and important part of the treatment. It shows also that the operation on the anterior part of the vagina, as proposed by Hall and completed by Heming and others, is subject to the same failure.

CASE VIII.—*Procidentia Uteri; complete Eversion of the Cervix Uteri of twenty Years' Continuance; Removal of triangular Portions of the Cervix Uteri; Cure.*

Bridget Mathews, admitted into Bellevue Hospital, November, 1866; has had several children; complains of severe dragging sensation in the groins, and has had her menses very freely of late. On examination, the uterus was found prolapsed nearly 2 inches; the cervix was completely everted,

Fig. 14.



NATURAL SIZE.

A B. Triangular portion to be removed.

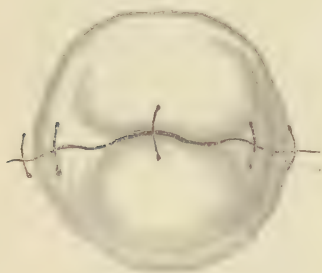
C D. External os uteri.

presenting a red bluish appearance (see colored plate), with a slight discharge of mucous secretion; there was an abrasion

near the os uteri. There was a cystocele and vaginal rectocele, both of a moderate extent. The uterus measured $2\frac{3}{4}$ inches in depth, and the rectal touch could feel the fundus of the uterus just within the labia, also the end of the sound through the body.

The operation performed was, removing a triangular portion from the cervix on each side, of an inch long (see Fig. 14), and then closing the cervix by two metallic sutures introduced on each side, and one in front (see Fig. 15). On the third morning the sutures were removed, the uterus returned into the pelvis, and the operation of episio-perineoraphy performed. The clamp-suture was adopted. On the sixth day the sutures were removed, and the perinaeum found perfect. Ten days afterward, the uterus was normal in position, and presented a natural appearance (see Fig. 16). The same treatment adopted as in the former case—water dress-

Fig. 15.



AFTER OPERATION.

Fig. 16.

NATURAL SIZE TWO MONTHS
AFTERWARD.

ings, and injections, catheterism, and sedative treatment to restrain the action of the bowels. Previous to the bowels being moved by a cathartic, I have always preferred an enema should be given, before the deep sutures are removed.

CASE IX.—*Complete Procidentia Uteri; complete Retroflexion externally; complete Eversion Uteri; Procidentia of twenty-five Years' Duration; lacerated Perinaeum; no Treatment.*

Patient admitted into Charity Hospital, May, 1865; aged 73 years. The uterus measured $1\frac{1}{2}$ inches; from the internal

orifice, $1\frac{1}{2}$ inches; when reëverted, 2 inches; slight cystocele and rectocele (see diagram).

FIG. 17.



TWO-THIRDS NATURAL SIZE.

A. Os internum. B. Os externum. C. Fundus uteri. Procidentia 25 years.

Remarks.—This case is presented to show the eversion that is manifested in cases where the uterus presents its normal length, yet retroflexed externally.

CONCLUSIONS.

1. That the opinion of M. Huguier—that the affection designated under the names of prolapsus or procidentia of the uterus, and which appears to be completely out of the pelvis, and is exterior to the vulva, is rare—is correct, though not as frequent as M. Huguier supposed, being in the proportion, according to my own investigations, as 1 to $12\frac{5}{6}$, instead of 1 to 32 of M. Huguier.

2. That there exists very seldom a true hypertrophic elongation or pathological change of structure of the supra-vaginal portion of the cervix; but that there is an elongation which, in a great many cases, varies from 1 to 4, 5, and 6 inches, though usually $4\frac{1}{2}$ to 5.

3. That the elongation is principally in the *isthmus* or intermediate part of the supra-vaginal portion of the cervix, and that this elongation is aided and sustained by the gravity of the cervix consequent, in a great measure, on the changes which have occurred during gestation or parturition.

4. That the assertion of M. Huguier—that the fundus of the uterus remains in the pelvic cavity as high as the superior strait or superior part of the symphysis pubis generally—is not verified; but that the fundus or body of the uterus is usually found retroverted or retroflexed, with the cervix in part external, or, as it is not infrequent, the uterus is procident, and retroflexed *in toto* externally.

5. That the infra-vaginal portion of the cervix is sometimes hypertrophied; but that it is in many instances a true and *complete eversion* of this part, measuring from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches.

6. That it is not necessary to remove as large a conical part of the cervix as described by M. Huguier; but the simple circular method will, in some cases, suffice, though, in other cases, the adoption of the other methods, as proposed, may be resorted to, according to the nature of the case.

7. That the only operation which fulfils the principal and correct indications in *this affection*, for the radical cure of this affection, is the amputation of the cervix uteri.

8. That the contraindications of M. Huguier, which have been referred to, do not forbid the operation, but require it.

9. That, to obtain a more perfect success in the treatment, the operation of episio-perineoraphy should be performed.

I have given a transcript of my own experience, and a record of a few cases I have treated in procidentia uteri with elongation, whether accompanied or not with hypertrophy. I have only added this mite on the altar of our profession, in comparison with the large gifts of others.

If I supposed that the correctness and accuracy of the views and opinions I have advanced were beyond all question; or, on the contrary, that their entire falsity would be asserted, I would not have ventured on the preparation and publication of this article. I believe the profession are at issue as to the facts and as to the interpretation of them in these cases. I trust the experience and investigations, as recorded, may not be viewed as entirely useless and profitless, but that both the facts and interpretations may be subjected to the test of scrutiny and inquiry. It is proper and just to ascertain as far as possible where an error has been committed in the observations, and, on the other hand, where wrong impressions have been adduced from right observations. I shall presume on the favorable consideration of those whose opinions I may have differed from. I hope that those who occupy their time and attention in laboring for the welfare and comfort of suffering women, who are compelled to undergo, perhaps for years, the inconvenience and distress consequent upon a *uterine hernia*, will contribute their own experience, in order to aid and benefit them.

II.—PULMONARY PHYSICAL SIGNS.

On the Analytical Study of the Pulmonary Physical Signs furnished by Auscultation and Percussion. By AUSTIN FLINT, M. D., one of the attending Physicians to Bellevue Hospital, and Professor of the Principles and Practice of Medicine in the Bellevue Hospital Medical College.

THE completeness of auscultation and percussion, as branches of medical knowledge, requires—1. That all the physical signs which these methods of examination are capable of furnishing, shall have been ascertained; 2. That the significance of the signs representing the various abnormal physical conditions which are incident to different diseases, shall have been fully determined, and; 3. That the differential characters, by means of which the signs severally may be recognized and discriminated from each other, shall have been rendered as distinct, simple, and reliable as possible. These three requirements fulfilled, auscultation and percussion have reached the limits of their development and improvement, as branches of knowledge; and then, to secure their utmost practical efficiency in diagnosis, it remains for physicians to acquire all that is known, together with the exercise of the judgment and skill to be derived from practice and experience.

Of the three requirements just stated, our existing knowledge, as regards the first, may probably be considered sufficient for its fulfilment. This statement is made with reference to the pulmonary signs. It is hardly to be expected that many, if any, new signs are yet to be ascertained. The employment of auscultation and percussion during nearly half a century has revealed all the acoustic phenomena which these methods are capable of detecting; additional new sounds of importance are not likely to be discovered. At the

present time, all that remains for completeness is the definitive and permanent settlement of the question how far are diversities in acoustic phenomena or sounds to be considered as giving rise to distinct signs; or, in other words, to what extent may distinct signs embrace diversities of sounds? If all abnormal sounds were to be regarded as so many distinct signs, wholly on account of their acoustic differences, the number of signs would be very great, for the diversities of sound are exceedingly numerous. For example, the dry râles produced within the bronchial tubes offer such diversities, that, guided by the latter alone, it would be easy to make a large list of signs. Taking, however, into account the physical conditions represented, and the diagnostic significance, it has been found practicable to so combine the diversities of sound, that all the dry bronchial râles may be embraced in two distinct signs, namely, the sibilant and sonorous. It is highly important not to multiply the signs to a needless extent, but, on the contrary, to reduce their number as far as may be practicable without detriment to physical diagnosis. It should be a source of much encouragement to one entering upon the study of auscultation and percussion, to know how few are the signs which comprehend all the practical information to be derived from these methods. The number of signs need not exceed thirty. Regarded as a language, the vocabulary only embraces thirty words.

The second of the requirements for the completeness of these branches of knowledge, namely, the significance of the signs as regards the morbid physical conditions which they severally represent, may also be considered to be nearly fulfilled. The meaning of each of the important signs has been determined; that is, when any of the signs are present, it is positively known that certain definite morbid physical conditions must exist. This is not saying that the existing disease is at once declared by the presence of certain signs. The signs, in themselves, represent only physical conditions, and a physical condition which gives rise to certain signs may be common to different diseases. Thus, solidification of lung occurs in pneumonia, in tuberculosis, and in pleurisy with large effusion. The signs of solidification are the same in each

of these affections, and the diagnosis is to be made by the combination of signs and the associated circumstances in each case. So, the subcrepitant râle occurs in capillary bronchitis, in pneumonia, in bronchorrhagia, and in œdema of the lungs. As a physical sign, it is the same in each of these affections; but the other signs found in combination and the associate circumstances enable the diagnostician to determine in individual cases which one of these different affections exists. On entering upon the study of auscultation and percussion, it should be clearly understood that the signs represent, severally, not different diseases, but different morbid physical conditions. Having ascertained the latter, it remains to determine, in particular cases, the diseases to which they are incident.

The statement that the significance of each of the important signs has been determined, does not imply competency to explain fully the manner in which all the signs are produced. The physical principles involved in the production of certain of the signs are not settled to the satisfaction of all minds; there is room here for discussion and difference of opinion. But it is a fact not to be lost sight of in the study of auscultation and percussion, that our existing knowledge of the significance, and thereby of the diagnostic value of the signs, depends, not on our ability to explain the mechanism of their production, but solely on their constant association with certain morbid physical conditions, as determined by direct observation. Desirable as it may be to settle all doubtful points concerning the *rationalité* of the signs, it is not essential to do so, and hence, regarding the subject in a practical point of view, I have not included this among the requirements for the completeness of our knowledge of auscultation and percussion.

The third of the three requirements for the completeness of auscultation and percussion, as branches of medical knowledge, is, "That the differential characters, by means of which the signs severally may be recognized and discriminated from each other, shall have been rendered as distinct, simple, and reliable as possible." The chief object of this paper is to offer considerations relating to this last requirement. What are

the true sources of the differential characters of the different signs! What are the differential characters as derived from their true sources, and are they distinct, simple, and reliable? These questions lead to the foundation of the practical availability and efficiency of auscultation and percussion as applied to diagnosis. Assuming that all the physical signs to be obtained by these methods, together with their significance, have been correctly determined, it is obvious that the application of this knowledge at the bedside will be more or less successful in proportion as the signs are to be recognized and discriminated from each other with facility and accuracy. It is quite needless to dwell upon the importance of the foregoing questions, and I shall, therefore, at once proceed to the considerations which they suggest.

What are the true sources of the differential characters of the different signs?

The signs furnished by auscultation and percussion, excepting those in which all sound is suppressed, are sounds, and a natural division of them is into—1. Signs which are abnormal modifications of the normal sounds pertaining to respiration and the voice; and, 2. Signs which are adventitious or altogether morbid sounds, and which may be added either to the normal sounds or to their abnormal modifications. The second class of signs may be embraced under the name *RÂLES*. Practically the latter are less important than the signs belonging in the first class, and their differential characters are more easily and clearly defined; indeed, the difficult and nice points involved in the recognition and discrimination of the different signs relate chiefly to the abnormal modifications of normal sounds. Now, in seeking an answer to the question as to the true sources of the differential characters of acoustic signs, and especially of those last referred to, let us inquire under what different aspects may they be studied with reference to their recognition and discrimination.

One aspect is their analogies to sounds other than those emanating from the chest. This is the aspect under which the signs were naturally at first considered. In determining the different signs, Laennec was led to compare them with fa-

miliar sounds to which they bore more or less resemblance, But the analogies to extra-thoracic sounds are limited and unsatisfactory. The respiratory and vocal morbid sounds are so peculiar that it is difficult to give an adequate idea of them by comparison with other sounds. While comparisons are admissible as far as they are available for illustration, here is not the true source of the differential characters of the different signs.

In another aspect the sounds are considered with reference to the impressions which they at once convey of the existence of certain morbid physical conditions. Certain sounds are considered as *a priori* denoting certain morbid physical conditions. Thus, it is not uncommon to say of a cavernous respiration, that it is a sound as if air entered a cavity. Nothing can be more fallacious than this as a source of the differential characters of the different signs. In determining the signs, Laennec did not escape errors from this source. It would be impossible to derive definite and reliable differential characters from the ideas which the sounds in themselves might convey. The impressions made on different minds by the same sounds differ, and any approach to precision or accuracy is rendered impossible by the scope allowed to the imagination and to preconceptions.

In a third aspect the signs are studied with reference to elements into which all sounds, wherever produced, are alike resolvable. What are the various sensible points of difference in musical and other sounds? The most striking and important relate to intensity, pitch, and quality. Sounds differ in being relatively louder or weaker, higher or lower, and in a multitude of peculiarities embraced under the name *timbre* or quality. To form an idea of the diversities as regards the last-named point of difference, viz., in quality, it is only necessary to call to mind the fact that among thousands of human beings the voice of each person is distinguished by some peculiarity. The innumerable shades of variation in the human voice, which are independent of differences in intensity and pitch, relate to quality of sound. Of the three points of difference which have been named, those relating to pitch and quality are by far the more available in the recognition and

discrimination of the more important of the signs furnished by auscultation and percussion. Points of difference other than these three are the duration of the sounds and their proximity to or distance from the ear. These last-named points, although relatively less important, are by no means unimportant. In these several points of difference are the true sources of the differential characters of the different signs. To determine the differential characters of the signs as derived from differences relating to intensity, pitch, quality, and duration, together with proximity to or distance from the ear, is the object which distinguishes the analytical study of the signs furnished by auscultation and percussion. A clear apprehension of these several points of difference in sounds, and an education of the ear, by practice, to appreciate them with facility and accuracy, are essential, by way of preparation, for entering on this analytical study.

What are the differential characters as derived from their true sources, and are they distinct, simple, and reliable?

A clear apprehension of the several points of difference among sounds, especially of those points expressed by the terms intensity, pitch, and quality, having been obtained, the first step in the analytical study of the signs furnished by percussion and auscultation, is to acquire and become familiar, practically, with the characters, derived from these sources, which belong to the normal sounds. The normal resonance on percussion, or the normal vesicular resonance, the normal respiratory or vesicular murmur, the normal vocal resonance, and the normal sound produced by the whispered voice—these are the healthy signs; and they are to be analyzed with reference to characters derived from intensity, pitch, quality, and duration of sound. In the writer's experience, one of the greatest difficulties in the way of successful teaching in this department of medical practice often arises from inability to secure for this first step an adequate amount of time and labor. Many cannot be made to appreciate sufficiently the necessity of giving ample attention to the healthy signs, before entering upon the study of the signs of disease. In this fact is to be found the explanation of failure, in many instances, to acquire

a satisfactory knowledge of auscultation and percussion. The healthy chest should, first of all, be studied carefully and patiently, with reference to the characters of the healthy signs, the diversities as regards these characters in different persons within the limits of health, the points of disparity between the two sides of the chest in corresponding situations, and the differences in different regions on the same side of the chest. A thorough practical acquaintance with the healthy chest, in the several aspects just named, is not only indispensable as the first step in acquiring a knowledge of the signs of disease, but it secures an amount of practice which greatly facilitates subsequent progress. I shall content myself here with simply an enumeration of the characters of the healthy signs.

The normal resonance on percussion has an intensity which varies much in different healthy persons, and varies, of course, in different regions on either side of the chest. The pitch is low, as compared with the pitch of the signs of disease; it is lower than that of any of the latter. The quality is *sui generis*; it cannot be described, nor can an accurate idea of it be conveyed by any analogy to a resonance produced otherwise than by percussion over healthy lung. As the peculiar quality is due to the air which yields the resonance being contained in the air-vesicles, it may be distinguished as *vesicular*; and the sign is often called the normal vesicular resonance. It is an important fact, in its practical bearing on diagnosis, in certain cases of tuberculosis, that the normal resonance is somewhat less intense, the pitch higher, and the vesicular quality less marked on the right than on the left side of the chest anteriorly at the summit.

The normal respiratory or vesicular murmur has the following characters: The inspiratory sound is of variable intensity in different persons, and in different portions of the chest in the same person. It is low in pitch; its quality is *sui generis*, and the term vesicular is also used to denote the quality of this sound, as well as the quality of the normal vesicular resonance on percussion. Its duration is usually the same as that of the inspiratory act. The expiratory sound is in a certain proportion of persons wanting. When present, it is much

shorter than the sound of inspiration; in pitch it is lower, and, as regards intensity, it is weaker than the latter. It has no vesicular quality, but its quality may be expressed by the term blowing.

The healthy variations in different parts of the same chest, and the points of disparity between the two sides at the summit, are of much practical consequence. Over the primary bronchi, and their primary branches, in front and behind, the vesicular quality of the inspiration is often less marked than elsewhere, and the pitch is higher, the expiratory sound is often prolonged with greater intensity, and it has a quality which is tubular instead of blowing. These variations are more marked on the right than on the left side. An imperfect appreciation of these points of disparity between the two sides of the chest not infrequently leads to error in diagnosis.

The normal vocal resonance is a resounding of the voice through the chest, when words are spoken aloud, which varies very much in intensity in different persons, and in different regions of the chest of the same person. It is low in pitch as compared with modifications caused by disease. It conveys to the ear the idea of diffusion and distance. It is frequently accompanied with more or less of a thrill or vibration, called fremitus, which is a tactile, not an acoustic, sensation. The sign may be defined a distant, diffused resonance of the voice, accompanied with more or less fremitus. It is highly important, in auscultating the voice with reference to disease, to bear in mind the fact that the vocal resonance, as also the fremitus, is in nearly all persons distinctly and often notably greater on the right than on the left side, in every region of the chest.

The sign heard with the whispered voice in health is a short, blowing sound, low in pitch; variable in different persons, and not always heard anywhere; frequently wanting, except within the upper third; louder over the primary bronchi and their primary branches than elsewhere; a little louder on the right than on the left, and a little higher in pitch on the left than on the right side, especially over the primary bronchi and their primary branches. This sign may be called the normal bronchial whisper. Its characters correspond to those of the expiratory sound in the normal vesicular murmur.

Having determined by direct observation the characters which belong to the healthy signs, the next step, in the analytical study of the signs furnished by percussion and auscultation is to resolve the signs of disease into the characters derived from intensity, pitch, quality, duration, and proximity to the ear; then, by comparing the signs of disease with the healthy signs, and with each other, their differential characters, derived from their true sources, are rendered distinct, simple and reliable. The remainder of this paper will be devoted to the differential characters of the pulmonary signs of disease, as determined by comparison with the healthy signs, and with each other, in respect of the points of difference just named. The differential characters of the signs furnished by percussion will be first considered, and afterward the signs furnished by auscultation.

The number of signs obtained by percussion need not exceed six, and it is practicable to reduce the number to four, namely: flatness or absence of resonance, dullness or diminished resonance, tympanitic resonance and vesiculo-tympanitic resonance. The two signs known as cracked metal and amphoric resonance may with propriety be reckoned as varieties of tympanitic resonance; if not so reckoned, they are of course to be added to the four just named. What are the differential characters of these signs as determined by comparison with the normal resonance and with each other?

Flatness or absence of resonance—the sign representing either pleuritic effusion, pulmonary oedema, solidification of lung, or a tumor within the chest—is quickly disposed of. The absence of resonance expresses at once and with sufficient distinctness its sole character. As there is no resonance, there is, of course, no room for comparison with respect to pitch, quality, etc. This is the only example of a sign furnished by percussion which is not a sound.

Dullness or diminished resonance involves, as these names denote, an intensity less than the normal resonance. The vesicular quality is less marked than in health, chiefly because the intensity of the sound is diminished. The pitch is always higher than that of the normal vesicular resonance; there is

no exception to this rule. Duration and proximity to the ear do not supply any important differential characters. We may formularize the signification of this sign by saying that it represents a relative disproportion of solids or liquids over air within the chest, the disproportion not being such as to cause flatness; hence it is met with in cases of tuberculosis, pneumonia, pleurisy, œdema of lung, carcinoma, gangrene, and extravasation of blood.

Tympanitic resonance is a sign concerning which there is much confusion. There can be no room for obscurity or difference of opinion, if we adopt as its distinctive character an entire absence of vesicular quality. It is a sufficient definition of this sign to say that it is a resonance utterly devoid of that vesicular quality which characterizes the normal resonance, and, in a greater or less degree, other of the signs furnished by percussion. The absence of the vesicular quality always occasions more or less elevation of pitch; a tympanitic resonance is invariably higher than the normal vesicular resonance. Accurate, direct observation will sustain this assertion, although it is in opposition to the statements of some authors. The point is, of course, not to be settled by argument, but by direct observation only. There is no exception to the rule that a tympanitic resonance is higher in pitch than the normal vesicular resonance; but the variation in pitch in different examples of tympanitic resonance is considerable. Much of the confusion concerning this sign arises from considering it as being of greater intensity than the normal resonance. The sign derives no differential character from intensity. It may have greater or less intensity than the normal resonance. Duration of sound and proximity to the ear supply no distinctive characters to this sign. The sign represents the following physical conditions: Air in the pleural cavity (pneumo-thorax); solidification of an upper lobe, the resonance then coming from the air contained in the primary bronchus and its primary branches; air in a pulmonary cavity with rigid walls, and the conduction of resonance from the stomach and colon, especially when the lower lobe is rendered by solidification a better conductor of sound than the healthy lung.

The fourth sign is an increased, or, as I have preferred to call it, a vesiculo-tympanitic, resonance. This sign is often confounded with tympanitic resonance. Its differential characters are : first, an increase of intensity, that is, an intensity greater than that of the normal resonance ; secondly, a quality which combines, in variable proportions in different cases, the vesicular and the tympanitic, as expressed in the name vesiculo-tympanitic ; thirdly, the pitch is always higher than that of the normal resonance, and high in proportion as the tympanitic preponderates over the vesicular quality. These differential characters, as well as those of tympanitic resonance, are distinct, simple, and reliable. The vesiculo-tympanitic resonance represents especially dilatation of the air-cells, or vesicular emphysema. It is obtained also over a healthy lobe, either the upper or lower, when the other lobe of the same lung is solidified ; and it is obtained over lung partially compressed by pleuritic effusion.

Amphoric and cracked-metal resonance, as already stated, may be reckoned varieties of tympanitic resonance. The first is distinguished by the simple fact of the existence of a musical quality, and the second by a resemblance to the sound produced by striking a cracked vessel, as the name denotes. The latter character is derived from analogy ; and the former is also thus derived to some extent, the musical sound being compared to that caused by blowing upon the open mouth of an empty bottle. These signs represent either pneumo-thorax or pulmonary cavities which are empty and have rigid walls, with some important exceptions. In all the exceptional instances, the sound must come, if over the upper lobe, from air contained in the primary bronchi and their primary branches, or, if over the lower lobe, from air in the stomach or colon.

Reviewing now the differential characters of the signs furnished by percussion, it will be seen that any practical difficulties in the way of their recognition and discrimination relate only to three, namely, dulness, tympanitic and vesiculo-tympanitic resonance. Of these three signs, the most distinctive of the characters of two, namely, dulness and vesiculo-tympanitic resonance, are derived from intensity of sound ; the intensity in the former of these two signs is less, and in the

latter it is greater than that of health. In both these two signs, the pitch is higher than in health. The advantage of directing attention to the pitch of sound, in deciding as to the presence of either the one or the other of these two signs, is exemplified in certain cases of emphysema. A patient has had cough and expectoration for a greater or less period, and the history may suggest the supposition of phthisis. On examination by percussion, there is found to be a disparity between the two sides of the chest, in the infra-clavicular region, as regards intensity of resonance. Now, this disparity may be due either to dulness in the region where the intensity is relatively less, or to exaggerated resonance in the region where the intensity is relatively greater. If the former be true, the disease is probably phthisis; if the latter be true, the disease is probably emphysema. This problem, which is one of the nicest in the practice of percussion, may be settled without resorting to auscultation, by a comparison of the pitch, together with the quality of the resonance, on the two sides. If the disparity be due to dulness on one side, the pitch of the sound will be higher where the resonance is less; if the disparity be due to an increase of resonance on one side, the pitch will be higher where the resonance is greater, and the quality, in the latter case, as compared with the resonance on the other side, will be a mixture of the vesicular and tympanitic, that is, vesiculo-tympanitic.

It is worthy of note, that the abnormal variations in pitch and quality follow a definite law as regards the concurrence of these two points of difference. If the vesicular quality be diminished or annulled, the pitch is raised; hence the rule, without an exception, that dulness, tympanitic and vesiculo-tympanitic resonance are higher in pitch than the normal vesicular resonance. It will be found that, among healthy persons, in proportion as the vesicular quality of the normal resonance is marked, the pitch is low, and, *per contra*, in proportion as the vesicular quality is feeble, the pitch is high. This law obtains, too, over different portions of the healthy chest in the same person. Over the primary bronchi and their primary branches, the resonance, as compared with that elsewhere, is vesiculo-tympanitic in quality and higher in

pitch. Over a part of the chest where comparatively the resonance is dull, namely, over the scapulæ, the pitch is higher than in the infra-scapular region.

It is needless to state to those who have given attention to percussion and auscultation, that, in comparing the signs of disease with those of health, the latter are always to be considered as presented in the person under examination. In other words, owing to the considerable diversities of the healthy signs among different persons, there can be no abstract standards in respect of the degree of manifestation of the characters of these signs. Thus, limiting our attention to the normal vesicular resonance, not only is its intensity variable in different persons, but the vesicular quality is more or less marked, with corresponding variations in pitch.

Proceeding to consider the differential characters of the signs furnished by auscultation, the first reflection is, that the number of the signs exceeds much the number of those furnished by percussion.

Of the auscultatory signs, however, there are only a few which call for great nicety in their discrimination; and these signs are chiefly among those which are abnormal modifications of healthy sounds. The signs which are adventitious or superadded sounds, that is, the *râles*, are, in general, easily discriminated. The latter may be dismissed with a few words. Of the former, I will notice first, the signs which pertain to the respiration; next, the vocal signs; and lastly, the abnormal modifications of the normal bronchial whisper.

The respiratory signs, other than the *râles*, are, *first*, the bronchial or tubular respiration, the broncho-vesicular or vesiculo-tubular respiration, the cavernous respiration, and the amphoric respiration. These are distinguished, severally, by characters derived from points of difference relating chiefly to quality, pitch, and duration of sound. Intensity of sound enters very little into their differentiation either from each other or from the normal vesicular murmur; and the same is true of proximity to the ear. But, *second*, there are three respiratory signs, of which the differential characters relate exclusively to intensity. These signs are exaggerated

vesicular murmur, diminished vesicular murmur, and suppression of respiratory sound. The names of these three signs are sufficiently descriptive. I will notice the foregoing signs of the first and the second group, in the order in which they have been enumerated, with reference to the question, "What are their differential characters, as derived from their true sources, and are they distinct, simple, and reliable?"

A comparison of the bronchial or tubular respiration with the normal vesicular murmur, as regards points of difference pertaining to intensity, pitch, and quality, leads to the following differential characters: The inspiratory sound is variable in intensity, high in pitch, and for the vesicular quality is substituted another which may be called tubular. The expiratory sound is as long as, or longer than, the inspiratory, higher in pitch, more intense in forced breathing, and tubular in quality. In general, both an inspiratory and an expiratory sound are present, but either may be wanting. With these highly distinctive characters, the sign represents complete or considerable solidification of lung. It is by no means certain that it represents ever simple dilatation of the bronchial tubes; but if it do, the examples are so rare of dilatation without solidification that they may practically be disregarded.

The broncho-vesicular or vesiculo-tubular respiration represents the different degrees of solidification below an amount sufficient to give rise to the bronchial or tubular respiration. The names of this sign express the distinctive characters relating to quality in the inspiratory sound; the quality is a mixture of the vesicular and bronchial, or the vesicular and tubular, in variable proportions. The pitch of the inspiratory sound is always higher than that of the inspiratory sound in the normal vesicular murmur; and it is high in proportion as the tubular predominates over the vesicular quality, or, in other words, in proportion to the degree of solidification. The intensity is variable, and does not supply any character to the inspiratory sound. The expiratory sound is more or less prolonged, in pitch it is high, in quality it is tubular, and its intensity is greater than that of the inspiratory sound. In these characters it approximates to the expiratory sound in the bronchial or tubular respiration. This approximation is near in

proportion as the inspiratory sound approximates to the inspiratory sound in the bronchial or tubular respiration; and the approximation is comparatively remote in proportion as the inspiratory sound approximates to that of the normal vesicular murmur. The characters of the inspiratory and the expiratory sound in this sign are always in harmony; that is, if in the inspiratory sound the tubular quality predominate and the pitch be high, the expiration is proportionably long, high, intense, and tubular; but if, in the inspiratory sound, the vesicular quality predominate and the pitch be less high, the duration, intensity, and tubularity of the expiratory sound are proportionately less, and the pitch is less high. These variations, as regards degree in the characters of the sign, represent different degrees of solidification. In general, both the inspiratory and the expiratory sounds are present, as in the examples of bronchial respiration, but either may be wanting.

To appreciate the characters of this sign, it is necessary to study them in comparison with those of the normal vesicular respiration on the one hand, and the bronchial or tubular respiration on the other. When fully appreciated, the characters of the sign are sufficiently distinct, simple, and reliable. Its importance is to be estimated by reference to the diseases in which partial solidification of lung enters as a morbid physical condition. It is of special importance in the diagnosis of incipient phthisis. It is present in a large proportion of the cases of partial solidification of lung; but in some cases the respiratory sound is suppressed, or the sound is too feeble for the characters to be ascertained, so that the absence of solidification cannot be inferred from the absence of the sign in such cases. This statement is also true of the bronchial or tubular respiration.

The cavernous respiration is a sign concerning which there is great confusion among writers and practical auscultators. The existence of any characters distinctive of this sign is denied by Skoda; and the descriptions generally given of its characters are indistinct and unreliable. In practice the bronchial respiration is often mistaken for the cavernous; many consider a bronchial respiration cavernous when the intensity of sound is unusually great. Laennec attributed to the sign a

fallacious character, namely, the sensation of air entering into the ear of the auscultator, a character which he designated by the term blowing. Intensity does not furnish a character for the cavernous respiration; it may be more or less intense. Its distinctive characters are derived from pitch and quality; and, with regard to differentiation, it is to be compared with, on the one hand, the bronchial respiration, and, on the other the normal vesicular murmur. What are the differential characters derived from pitch and quality of sound? The inspiratory sound is low in pitch as compared with the inspiratory sound in the bronchial respiration. Its quality is neither vesicular nor tubular; it has instead a hollow, or, as I would term it, a simple blowing quality. The expiratory sound has the same quality and is lower in pitch than the inspiratory sound. When these characters are present without any regard to intensity of sound, or of duration, or of proximity to the ear, the sign represents a cavity with flaccid walls, into which air enters in the act of inspiration, and from which air is expelled in the act of expiration. No other auscultatory sign is more distinct, simple and reliable. Its absence at the time of examination is not evidence that there is not a cavity, several conditions in connection with a cavity being necessary for the production of the sign, namely, emptiness of the cavity, a free communication with the bronchial tubes, and proximity of the cavity to the thoracic parietes.

The amphoric respiration requires but a passing notice, as regards its differential characters. Excluding the dry bronchial *râles* which are musical, and with these it need never be confounded, this sign is sufficiently characterized by a musical quality resembling the sound produced by blowing upon the open mouth of an empty phial. There is no difficulty in its recognition, and when present it denotes either perforation of lung or a pulmonary cavity with rigid walls.

Of the auscultatory signs none are more important than those just considered, and, with the exception of the one last named (amphoric respiration), they involve in their discrimination nicer points of difference than the great majority of those which remain to be noticed. The three abnormal modifications of the normal vesicular murmur which are now to be considered are quite simple.

An exaggerated respiratory murmur, called also puerile, supplementary, and hyper-vesicular respiration, is a simple increase of intensity, without any other notable modification. The vesicular quality is marked in proportion to the increase of intensity. The pitch, although variable in different cases, never rises to that of either the bronchial or broncho-vesicular respiration. This sign represents augmented functional activity of the respiratory function of the lung over which it is heard, this increased functional activity resulting from the function of the other lung being weakened or suppressed.

Diminished respiratory murmur, or weak respiration, is simply a decrease of intensity, without any other notable modification. It is incident to emphysema, bronchitis, lessened respiratory movements on one side from pain or paralysis, etc. The only point connected with this sign which I will stop to notice is one of considerable practical importance. With a weakened inspiratory sound, in certain cases of emphysema, the expiratory sound is lengthened, and its intensity may be greater than in health. In these cases, without attention to characters derived from pitch and quality, the prolonged expiration is liable to be considered as belonging to a bronchial or a broncho-vesicular respiration, and as consequently denoting solidification of lung. A prolonged expiration, without regard to characters aside from its duration, is not infrequently relied upon in the diagnosis of phthisis. But the prolonged expiration due to emphysema, or to any cause aside from solidification of lung, may always be discriminated by means of its pitch and quality. Its pitch is low and its quality blowing, instead of the high pitch and tubular quality which are the characters of a prolonged expiratory sound when it denotes solidified lung.

Suppression of respiratory sound need only be named. It occurs in connection with pleuritic effusion, in some cases of emphysema, as a consequence of obstruction of bronchial tubes, sometimes when there is solidification of lung, and over an intra-thoracic tumor.

Passing from the respiratory modifications to the vocal signs, meaning by this term the signs produced by the loud voice, the latter may be grouped into, *first*, vocal signs, the

characters of which are derived from pitch, quality, and proximity to the ear, the intensity being unimportant; and, *second*, vocal signs, the characters of which relate chiefly to intensity. The signs in the first group are, bronchophony, pectoriloquy, aërophony, and amphoric voice or echo; the signs in the second group are, increased vocal resonance, diminished vocal resonance, and suppression of vocal resonance. The characters of the latter signs are as simple as possible; and the analytical study of the former signs leads to differential characters less nice or difficult than those which belong to the correlative respiratory signs.

If the transmission of the voice be such that it seems concentrated and near the ear, and the resonance be notably raised in pitch, bronchophony exists, and the sign represents uniformly complete or considerable solidification of lung. The intensity is frequently increased, but it may be less than that of the normal vocal resonance of the person examined; the intensity does not enter at all into the characters distinctive of the sign. The fremitus may be increased, but it is not infrequently diminished; this does not belong to the acoustic sign, but is a superadded tactile sensation. It is important to remark that an approach to bronchophony, and even the well-marked characters of the sign, are in some persons found in health over or near the site of the primary bronchi. The absence of the signs will suffice to show that this is a normal peculiarity. The bronchophony of health may be present on the right, and not on the left, side of the chest. As a morbid sign, bronchophony is correlative to the bronchial or tubular respiration, but a degree of solidification insufficient for the respiratory sign just named may suffice to give rise to bronchophony; hence, the sign is often associated with a broncho-vesicular respiration approximating to the bronchial.

Pectoriloquy and bronchophony are often confounded. If the voice be transmitted with unusual intensity, pectoriloquy is incorrectly said to exist. Pectoriloquy requires more than the transmission of the voice, and, as will presently be seen, it may exist without the characters of bronchophony; it requires, as the name signifies, the transmission of speech, that is, of articulate words. This sign, interesting as the sign

which first opened up to the mind of Laennec the subject of auscultation, has lost the importance attributed to it by the illustrious founder of auscultation; that is, it is no longer considered as in itself the sign of a pulmonary cavity. Articulate words, without a doubt, may be transmitted through solidified lung. Pectoriloquy, however, may be a cavernous sign, and it is easy to determine this in certain cases. There is a bronchophonic and a cavernous pectoriloquy, the former denoting only solidified lung, and the latter representing a cavity. I am not aware that the differentiation of these two kinds of pectoriloquy has been made by others, but the points of difference are very simple, and it is a matter of surprise to me that, during many years of attention to the analytical study of auscultatory signs, these points have only recently suggested themselves. If the transmission of speech be accompanied by the characters of bronchophony, namely, elevation of pitch and proximity to the ear, the pectoriloquy is bronchophonic; it may be due simply to solidification of lung. If, on the other hand, the transmission of speech be not associated with these characters of bronchophony, the pectoriloquy is cavernous.

Ægophony affords an illustration of the looseness and uncertainty of a sign distinguished solely by a resemblance to an extra-thoracic sound. Thinking only of the analogy to the bleating of the goat, it is common enough for bronchophony to be called ægophony; in fact, the latter may be considered as a variety of the former. If a well-marked example of ægophony be analyzed, the pitch is high, like that of bronchophony; the proximity to the ear may or may not be as marked as in the last-named sign. The ægophonic feature which is added to the bronchophonic characters is a tremulousness in which consists the resemblance to the bleating of the goat. Whether it be regarded as a variety of bronchophony, or a separate sign, its significance, as representing a certain amount of pleuritic effusion, certainly, in the great majority of cases, is undoubted.

Amphoric voice or echo requires only the statement that the vocal resonance is either accompanied or followed by a musical sound, such as characterizes amphoric respiration, and that its significance is the same.

The vocal signs, the characters of which relate chiefly to intensity, namely, increased vocal resonance, diminished vocal resonance, and suppression of vocal resonance, are without any difficulty recognized and discriminated from each other; the distinctive character of each is expressed in the name. Practically, they are important signs. Increased vocal resonance is simply a greater or less morbid increase of the intensity of the resonance, without any other notable change; the sound of the voice is distant, diffused, and not notably raised in pitch. The vocal resonance may be intensified to the utmost limit of loudness to which bronchophony ever attains, without the bronchophonic modifications; and, on the other hand, the bronchophonic characters may be well marked with a feeble resonance. An increase of the vocal resonance without the characters of bronchophony represents solidification of lung, but in a degree insufficient to produce bronchophony. It is the vocal sign correlative to the bronchovesicular respiration, when the latter denotes slight or moderate solidification. It is often a valuable sign in the diagnosis of phthisis.

Diminished resonance and the suppression of vocal resonance—in the former the characters of the resonance being the same as in health in all respects save intensity—are important signs in determining the existence of liquid effusion, and of a tumor within the chest. They belong among the signs which need only to be named to be understood.

The abnormal modifications of the normal bronchial whisper form a group of signs, heretofore not acknowledged as such, which are of considerable utility in diagnosis. Their differential characters are readily understood, when it is considered that a whisper is usually an expiratory act. This being so, the characters must be those of the sound of expiration. If a person pronounce in a whisper words with effort, the sound corresponds to that produced in expiration by forced breathing; it is apt to be louder, and is, therefore, more available than the latter. An intense, high-pitched, tubular sound, produced by whispered words, corresponds to the expiratory sound in the bronchial respiration, and, of course, has the

same signification. This sign may, therefore, be called the bronchophonic whisper, or whispering bronchophony. A sound, less intense, less high, and less tubular, corresponds to the expiratory sound in the broncho-vesicular respiration, and may be called increased bronchial whisper. It is correlative to increased vocal resonance, and denotes partial solidification of lung. A sound, low in pitch, and hollow or blowing in quality, the intensity being variable, corresponds to the expiratory sound in cavernous breathing, and may be called the cavernous whisper. It is a beautiful illustration of this sign, when, as is not infrequent, its characters are shown in marked relief by its being found side by side with the bronchophonic whisper. The amphoric whisper is, of course, at once understood.

The transmission of the whispered speech, that is, the articulate words pronounced in a whisper, has heretofore been known by the name whispering pectoriloquy. It is much oftener met with than pectoriloquy with the loud voice. Like the latter, it is of two kinds, namely, bronchophonic and cavernous. If with the transmission of speech the whispered sound be high in pitch, and tubular, the pectoriloquy is bronchophonic; if, on the other hand, the whispered sound which is transmitted be low in pitch, and hollow or blowing in quality, the pectoriloquy is cavernous.

As already stated, the *râles* may be dismissed with a few words. The dry bronchial *râles* (sibilant and sonorous) can hardly be confounded with other signs. Auscultation could well afford to dispense with the varied sounds embraced under this head, for they are apt to obstruct the appreciation of other signs which are of greater practical importance. The moist bronchial *râles* are useful, denoting liquid of some kind—mucus, serum, blood, or pus—in the bronchial tubes. They cannot be mistaken for other signs; and the large or small bubbling, generally expressed by the words coarse and fine, denotes the size of the tubes in which the *râles* are produced. The pleural friction-sound, metallic tinkling, and gurgling, also, have each its distinctive characters, which the names of these signs imply.

The only differentiation, as regards the *râles*, which involves much nicety, is the discrimination between the crepitant and the subcrepitant. Both are important signs. The differential characters may be sharply defined as follows: The subcrepitant *râle* is a moist *râle* made up of small bubbles, often, apparently, of unequal size; it may be heard during any portion of the inspiratory act, and is liable to be heard in the expiratory act. The crepitant *râle* is a very fine, dry, crackling *râle*, made up of crackling sounds apparently of equal size; it is rapidly evolved at the end of the inspiratory act, and is never heard in the act of expiration. The subcrepitant *râle* is especially valuable in the diagnosis of bronchitis affecting the tubes of small size, and of pulmonary tuberculosis. The crepitant *râle* is often of value in the diagnosis of pneumonia.

The subcrepitant and the crepitant *râles* derive a significance from their pitch, which is of interest and value. If they emanate from lung considerably solidified, their pitch is notably high; if, on the contrary, they emanate from lung not solidified, their pitch is relatively low. The elevation of pitch is proportionate to the degree of pulmonary solidification; hence it is practicable to determine the absence or existence of solidification, and its degree, by the pitch of these *râles*, without the aid of other respiratory or the vocal signs. This incidental significance of these *râles* is, so far as my observation goes, but little known among auscultators. It was obscurely and incompletely enunciated, many years ago, by Skoda.

In conclusion, the motive which has prompted the preparation of this paper is, a desire to promote a more thorough and widely-diffused practical acquaintance with percussion and auscultation. The writer has aimed to contribute to these ends by endeavoring to give a succinct exposition of the mode of study which he would distinguish as analytical; and, by giving in a brief article an account of the differential characters of the thirty signs furnished by percussion and auscultation, he has hoped to show that, to acquire a satisfactory knowledge of the subject, is by no means a tedious or difficult undertaking.

III.—ENTIRE EXCISION OF THE OS CALCIS.

On Entire Excision of the Os Calcis. By F. A. BURRELL, Jr., M. D., of New York; formerly Visiting Surgeon to the Charity Hospital; one of the Surgeons to the Northern Dispensary.

A FEW years ago opinions were much more divided than at present concerning excision of the calcaneum. It is not strange that a removal of this bone should have been regarded with distrust, for each one forms the posterior part of an arch, as is shown by the arrangement of its cancelli, which, under ordinary circumstances, sustains half the entire weight of the body. Hence, it would seem, from an examination of the bone and its relations to those adjoining, that its excision would be followed by much shortening of the leg, a tilting upward of the anterior part of the foot, weakness and distortion of the tarsus. Moreau considered the division of the tendo Achillis an objection to the operation, and states that "if the case be such that the tendo Achillis must be destroyed, it would be better to amputate the limb."¹ Other opinions of similar tenor are met with in the writings of eminent men, but experience has gradually demonstrated that many of the objections are hypothetical, with no more basis than that of the venerated Paré, who held fracture of the calcaneum to be a fatal injury, in consequence of the laceration of the numerous vessels connected with the bone.²

¹ London Lancet, Nov. 2, 1867.

² Desault's Surgery, translated by Charles Caldwell, M. D. Philadelphia, 1811.

Monteggia,¹ of Milan, is said to have first performed or reported this operation in 1823. In Mott's translation of Velpeau,² it is recorded that Dupuytren, in one of his lectures in 1816, stated that he had seen the os calcis in an infant produced entire, but whether after an operation, or as the result of disease, is not mentioned. Until 1848, when Mr. Henry Hancock removed the right calcaneum from an adult in Charing Cross Hospital, there are scarcely any cases of this operation on record, but since that time they appear more frequently. In the *British and Foreign Medico-Chirurgical Review*, of July, 1853, is a list of 12 cases, published by H. Martineau Greenhow, Esq., Mr. Hancock gives the particulars of 7 more in the *London Lancet* of November 2 and 9, 1867, and Dr. O. Heyfelder, in his "Lehrbuch der Resektionen,"³ makes a further addition of 9 to those [previously reported. These writers also notice the names of distinguished surgeons who have approved or adopted the operation, and Mr. Hancock further states that he has collected particulars of 34 cases.

The present paper is a study of 48 cases, in which the entire bone was removed.⁴ The list includes those cases which have been previously tabulated, with the addition of 19, which have been mostly collected from various journals.

¹ The Excision of Joints, by Richard M. Hodges, M.D. Boston, 1861, p. 189.

² Vol. i., p. 761.

³ Wien, 1863, p. 177.

⁴ In Heine's case (No. 2), the tuberosity of the bone was left.

Date.	Age.	Sex.	Condition or occupation.	Diathesis.	Origin and nature of disease.	By whom removed.	Result.
1 1823.						Monteggia, of Milan.	
2 1834.	13 F.					Heine, of Wurzburg.	Successful. The tuberosity of the bone was left to serve as an attachment for the tendo Achillis. The child walked in a month, and the leg is said to have been almost entirely regenerated.
3 1837.	4	Child.			Necrosis.	F. Robert	A portion of the external malleolus also removed. Partial recovery. Two years later return of syphilis in the part. Amputation of the leg. Recovery.
4 1845.	M.				Central caries of the calcaneum, and syphilitic osteitis with caries.	Dr. A. Meyer	Successful.
5 1846.	M.				Caries.	Dr. A. Meyer	Successful.
6 June 2, 1848.	24 M.	Butcher		Strumous.	Caries of right os calcis and abscess. Left leg had been amputated three years before for caries of knee-joint.	Mr. Henry Hancock, of Leeds.	Recurrent attacks of erysipelas. Amputation of leg four months after excision.
7 Aug. 15, 1848.	20 M.	Pitman		Strumous.	Wounded in left heel by a nail eight weeks previously. Abscesses formed and were opened. Os calcis found to be extensively carious, the disease extending to the astragalus. Part of astragalus also removed.	Mr. Greenhow, Newcastle Infirmary.	Recurrent attacks of erysipelas. Patient able to walk, with only slight halt, December 29th following.
8 Oct. 9, 1848.	16 M.			Unhealthy and ill-nourished.	Ulceration and suppuration, which commenced six months previously. Caries.	Mr. Page, at Cumberland Infirmary.	Patient had attack of inflammation of tarsal joints, but at the end of a year found the foot which had been operated upon as serviceable as the other.

Date.	Age.	Condition or occupation.	Diathesis.	Origin and nature of disease.	By whom removed.	Result.
9 Aug. 29, 1848.	29 M.	Pitman	Strumous	Disease of 2½ years' duration, commencing with inflammation and abscess. Extensive caries of os calcis.	Mr. Greenhow, New-castle Infirmary.	Slight sloughing of integuments. Able to walk freely on crutches February 10, 1849.
10 Dec. 5, 1848.	16 M.	Lived in the country; no occupation.	Strumous	Disease of seven months' duration, commencing in erysipelatos inflammation. Os calcis in state of advanced caries.	Mr. Greenhow	Successful.
11 1848.	10 M.	Deaf mute .....	.....	Caries of right os calcis....	M. Giraldés	Confined one month in hospital; then walked freely without any special apparatus.
12 July 3, 1849.	15 M.	Tailor	Ill-nourished	Friction of tight shoe, producing ulceration, which resulted in caries.	Mr. Potter, of New-castle.	In October, 1850, patient had walked six miles without inconvenience.
13 ?	19 M.	.....	.....	Caries	Dr. Paul	Patient died of phthisis as the wound was nearly closed.
14 1849.	30 M.	Jew .....	.....	Caries of the left calcaneum. In the posterior wall of the bone was a cavity, probably the seat of an encysted tubercle.	M. Giraldés	Died of pyæmia, three weeks after the operation, in a hospital where the sanitary conditions were bad.
15 Mar. 11, 1851	15 M.	.....	Strumous	Foot sprained five years previously; two years later abscesses and sinuses formed round the ankle. Os calcis carious.	Mr. Potter, of New-castle.	Some months after the operation a sinus remained, and the boy could not walk.
16 Mar. 20, 1851	22 M.	House-painter ..	Strumous	Had suffered from pain in heel and foot for ten years. Os calcis carious.	Mr. Gay, at Royal Free Hospital.	Complete recovery in six months.

17 April 28, 1851	10 M.	Impaired health	Disease of four months' duration. Necrosis of almost the entire calcaneum.	Dr. Mr. Simon, St. Thomas's Hospital.	Discharged cured May 30th.
18 Dec. 12, 1851	16	Mill girl.	Strumous. Caries. Had had disease of foot for three years, which commenced with inflammation and swelling.	Mr. Lowe, of Congleton.	Wound healed in less than two months, and patient walked easily.
19 1851.	34 M.		Caries and necrosis.	Dr. F. Robert.	The resulting limb was useful, but a relapse occurred in eighteen months, and the patient died of phthisis.
20 May 18, 1852	29 M.	Glassmaker.	Strumous. Exciting cause was erysipelatous inflammation. The disease was of seven months' duration. Calcaneum extensively carious.	Mr. Greenhow.	Unfavorable. Amputation became necessary November 2d. The astragalus, cuboid, scaphoid, and cuneiform bones were found carious.
21 July 26, 1852	17 F.		Caries. Ulcers behind the malleoli, through which a probe could be passed to the bone.	Mr. Field, Royal Infirmary, Margate.	Successful. On the fourth day the dressings were renewed, and almost complete union was found to exist between the cut surfaces.
22 1853.	28 F.		Caries?	Dr. Textor.	Three years afterward limb amputated for caries. The right leg had been amputated at the time of the excision.
23 1852.	35 M.		Caries of right calcaneum.	M. Girdés.	Complete cure in three months.
24 June 20, 1854	F.		Extensive caries. Inflammation and abscess of eight months' standing.	Mr. Greenhow.	September 18th went home in excellent health, though not yet able to bear weight on foot.
25 July 16, 1854	20 M.	Laborer.	Caries of calcaneum and astragalus. A cart passed over heel in childhood.	Mr. Greenhow.	The os calcis and astragalus were removed. Unsuccessful. Gangrene of foot; amputation of the ankle-joint, September 10th, stump doing well.

Date.	Age.	Sex.	Condition or occupation.	Diathesis.	Origin and nature of disease.	By whom removed.	Result.
26 Aug. 22, 1854	34	M.	Married		Three years ago fell and injured ankle. An abscess formed on dorsum of foot, which healed and again opened. Sinuses formed. The bone was carious. Nine months previously foot had been squeezed between two railroad cars. The foot became swollen, and in a week or two abscesses formed, followed by sinuses. The bone was carious.	R. W. Coe, Surgeon Bristol G. Hospital.	Discharged cured September 17, 1854. Eighteen months after the operation patient could walk ten miles daily without inconvenience.
27 Oct. 24, 1854.	12	M.			The wound healed mostly by adhesion. Two months after the operation the boy could run very swiftly.	Dr. Morrigh, New Brunswick, New Jersey, U. States.	
28 Dec. 1, 1855.	28	M.	Laborer	Healthy; strumous parents.	Inflammation and abscess Oct., 1852. Subsequent formation of sinuses. Anterior part of bone found in a state of sub-inflammation. Posterior carious.	Dr. J. M. Carnochan, New York.	Patient was soon strong and healthy. Dec., 1856, walked well with a padded heel.
29 1855.	24	F.			Caries	Mr. Tolly.	Successful.
30 1856.	F.					Dr. Jaeger	Successful. Healing rapid. and complete.
31 1856.	15	M.		Strumous.	Caries	Dr. Lunn.	Successful. Perfect recovery and useful foot.
32 1857.	27	M.			Caries and necrosis of left M. calcaneum.	Mr. Giraldés.	Cure slow but uncomplicated. A year afterward patient walked freely without apparatus.
33 Feb. 1, 1857.	54	M.	Jewish Rabbi.		Wounded in 1856 in the heel by a fragment of a bomb-shell.	Mr. Atkinson, at Jerusalem.	Was confined seven months in bed after the original injury. He then recovered complete use of

31	1858.	17 M.	.....	.....	Caries	.....	Dr. F. Heyfelder.	.....	foot. In 1850 a morbid growth sprang from the os calcis. This, with a slice of the bone, was removed by Mr. Sim. The disease returned and continued four years. After removal of the os calcis, progress was good, but on March 15, 1867, the wound still remained open. Astragalus also removed. Relapse occurred, and amputation became necessary.
32	Mar. 12, 1859	30 M.	.....	.....	Caries confined to os calcis.	.....	Mr. Mead, of Bradford, Eng.	.....	The disease seemed to be confined entirely to the os calcis. It returned in the tarsal bones, and amputation was performed at the lower third of the leg.
33	Sept. 28, 1861	29 F. Married	.....	Strong and healthy.	.....	Necrosis of right os calcis. Disease of seven months' standing.	Mr. Pemberton, of Birmingham.	.....	of Left hospital on crutches six weeks after the operation. Two years later could walk any ordinary distance, and the wound was sound.
34	Nov. 2, 1861	4½ M. Boy	.....	So-called mous.	.....	Extensive caries.	Mr. T. Holmes, London.	.....	Discharged Feb. 2, 1862. When seen, Jan. 30th, could run and dance like other boys.
35	July 5, 1862.	5 M. Boy	.....	So-called mous.	.....	Extensive caries. The lower surface of the astragalus was also removed with a chisel.	Mr. T. Holmes, London.	.....	Discharged Sept. 7th. Wound healed, and boy beginning to walk easily.
36	April 1, 1863.	M. Soldier.	.....	.....	.....	Caries following wound.	Dr. James C. White, of Kansas.	.....	By June 1st the wound had almost closed. The foot was natural in appearance, with movement of the joint. The astragalus also removed.

Date.	Age.	Sex.	Condition or occupation.	Diathesis.	Origin and nature of disease.	By whom removed.	Result.
40 May 14, 1863	7 F.	Girl	.....	So-called mous.	stru.-Extensive caries.	Mr. T. Holmes	Discharged June 30th, wound not healed. Seen Feb., 1866. "The limb operated upon is smaller, and two inches shorter than the other, one inch of which is said to be due to atrophy of the tibia from disuse preceding the operation. Can walk with apparatus, but not stop or stand for any length of time. The leg is also colder than the other." Patient recovered.
41 May 16, 1863	M.	Sergeant	.....	.....	Five months previously the os calcis had been perforated by a conoidal ball at short range. General caries.	Asst.-Surgeon C. R. Greenleaf, U. S. A.	
42 Feb. 18, 1865	7 M.	Boy	.....	So-called mous.	stru.-Extensive caries.	Mr. T. Holmes	Wound healing slowly, when patient was attacked with diphtheria and died March 23d.
43 1865	14 M.	Boy	.....	.....	Hyperostosis and caries with vegetation of the left os calcis.	M. Giralde's	Left hospital five weeks after operation, and walked freely without apparatus.
44 Mar. 1, 1866	42 M.	House-carpenter	Reduced by dis- case.	.....	Nine years previously fell from two-story roof and injured heel, since when he had suffered from pain and suppuration in that region.	Dr. J. Scott, Parkersburg, Va., U. S.	Patient able to resume work two months after operation.
45 1866	15 M.	Italian	.....	.....	Caries	M. Giralde's	Left the hospital in two months. Walked freely.
46 1866	10 M.	.....	.....	.....	.....	M. l'Agrégé Boeckel.	Prompt recovery and free walk.

47 Nov. 1, 1867	8 M. School-boy	Healthy	Inflammation and abscess, Dr. F. A. Burrall, New York.	Went down-stairs in two weeks with foot in sling. Dec. 18th could walk. March 7th attends school, walks and runs in ordinary shoes with very slight limp. Tendo Achillis united with the remaining portion of heel.
48 Jan. 5, 1868	13 M. Boy	Strumous	Patient strained foot by falling on it eight weeks previously. The periosteum became separated from the bone, which died <i>en masse</i> .	Dr. James L. Little, New York. Entirely recovered, with good use of the foot.
49 Mar. 18, 1868			Mr. Annandale	As much periosteum preserved as possible. Patient could walk.

A review of this list shows that the ages given in 40 of these cases varied from $4\frac{1}{2}$ to 54. Six were under 10, 16 from 10 to 20, and 16 from 20 to 40. There were five from 40 to 54; 38 were males, and 8 females. Thus the different periods of life are represented, and the majority of subjects for the operation is found among the young, the largest number being between the ages of 10 and 20. As might be inferred, males, in consequence of the greater exposure to which they are subject, are more liable than females to disease of this bone.

The *disease*, in 38 cases, is stated to have been caries, caries and necrosis in 1, and necrosis in 4; and in 18 cases, in which the exciting cause of the caries is given, it is, in 5, inflammation and abscess, 2 erysipelatous inflammation, 1 syphilis, and 3 gunshot injuries. In the other cases, the primary causes are stated to be—the friction of a tight shoe, a strain, the compression of a foot between two cars, the passage of a cart over the foot, a severe fall, and the puncture of the heel by a nail. Evidently caries is the principal cause of the disorganization of this bone.

Of 21 cases, the *diathesis* in 14 is stated as strumous, 3 were healthy, and the remaining 4 were in impaired health. One patient died of diphtheria, to which fact no special significance can be given as bearing upon the operation, and even in this case the wound was healing slowly when the disease made its appearance. One amputation was performed after recurrent attacks of erysipelas, and in the other the astragalus, cuboid, scaphoid, and cuneiform bones were found carious. A sinus remained for some months after the operation in one of the two remaining cases, and in the other the patient was able to walk freely on crutches. As far as the evidence of these instances is of weight, it gives the strongest reason to hope for a good result from this operation even in debilitated constitutions. Of the entire number of cases under consideration (48), the operation was successful in 33; 1 was convalescent at date of report; 2 could walk with crutches; and in 1 a sinus remained several months after the operation.

Only one *death* occurred which could be said to be connected with the operation, and even here it is doubtful whether any such connection existed. As was observed of the death

from diphtheria, so it may be said of that from pyæmia, that it did not bear with any special significance upon this operation. The other two deaths from phthisis occurred, one in four years and one in eighteen months after the removal of the bone. In both of these cases cicatrization had taken place, and the limb been of use for a year. Dr. Heyfelder thinks it worthy of note that the three deaths which he reports were of phthisis, but is uncertain how much significance should be given to the fact, since tubercles are likely to be developed during the weary convalescence which sometimes follows resections.

Seven secondary *amputations* were necessary. In one of these cases the astragalus had been removed at the same time with the calcaneum; in another, the astragalus, cuboid, scaphoid, and cuneiform bones were all carious, and in another the patient's left leg had been amputated three years before for caries of the knee-joint. One of the remaining amputations was not performed until three years after the excision, the cause being caries of the ankle-joint; one was for gangrene, one for obstinate development of the syphilitic diathesis in the vicinity of the resection, and in the last the disease returned in the tarsus, and the leg was amputated. In those cases where amputation was performed, the result seems to have been favorable, and it is worthy of notice that none of these amputations were necessary in children. The fact that, of 48 cases of this resection, secondary amputation was necessary only in 7, is, as Mr. Hancock observes of those cases which he has recorded, a powerful argument against the primary adoption of that step.

Of 17 cases in which the time elapsing from the operation to recovery is given, it will be noticed that, in 11, this period was from one to two months, the ages of these patients being from $4\frac{1}{2}$ to 16. The others recovered in from 3 to 18 months, their ages being from 20 to 35, with the exception of an ill-nourished patient of 16, who, nevertheless, at the close of a year, found the limb which had been operated upon as serviceable as the other. As will be observed, from noticing the list of ages, the prognosis would seem to be peculiarly favorable in children.

The main practical point to be deduced from the study of

the preceding table is, that primary amputation is rarely if ever advisable for disease of the os calcis. As is shown by the table, the operation of excision was successful in 17 of 21 cases, of which 14 were strumous and 3 healthy. The total number of these cases should rather be placed at 20, since one died of diphtheria. This leaves one case of amputation and one patient able to walk freely on crutches.

Here the question of partial excision¹ and gouging of the calcaneum must be noticed. As Mr. Holmes states, in his work on the surgical diseases of childhood, it would seem, at the first glance, as if it were desirable to save as much of the bone as possible for the purpose of preserving the strength and shape of the heel, as well as its muscular attachments. But, on the other hand, the liability of the disease to return after gouging and the very useful heel left after excision lead him to advocate a removal of the entire bone, where the extent of the disease renders the question of gouging or excision a doubtful one. Dr. Heyfelder says: "Partial resection is to be preferred to extirpation, when possible, both for the sake of leaving intact the joint and adjacent bones, as well as to preserve the muscular and ligamentous attachments. The easiest and most promising operations are the removal of a superficial slice or the posterior tuberosity (*Spornfortsatz*). But partial resections of the calcaneum are not always successful (5 failures among 54 cases), and amputation of the foot (twice) or extirpation of the bone (once) has been necessary. Of 60 cases of partial excision, in which superficial or deeper wedge-shaped portions, or even the larger part of the bone was removed, none ended fatally. Relapses occurred in 5 of 54 cases, rendering amputation necessary in three. In one case the *processus calcanei* had been twice removed before the amputation."²

The teachings of the experience thus far recorded seem to be, that when the disease is trifling or limited, partial excision should be practised. In those cases where the disease seems to involve the deeper portion of the bone or involve it extensively, and does not yield to rest or local applications, complete resection should be performed. It is very satisfactory

¹ First performed by Formius for a gunshot wound, 1669.

² "Lehrbuch der Resectionen," p. 185.

to know that in the majority of successful cases of entire excision the deformity of the foot operated upon is comparatively slight, and it is nearly as useful as when in a normal state. In performing this operation care should be taken not to make the incisions upon the sole, since the resulting cicatrix is likely to inflame and ulcerate. The operation of Mr. Holmes commends itself by its simplicity, and by the circumstance that the incisions are chiefly upon the external surface of the foot. In this, a horizontal incision is made from the inner edge of the os calcis, severing the tendo Achillis and going down to the bone, to midway between the heel and the projection of the fifth metatarsal bone, where the calcaneo-cuboid articulation is situated. A vertical excision leads from the extremity of the first to just within the sole, stopping short of the grooved internal surface of the os calcis where the vessels lie. The flap thus formed is dissected back, the calcaneo-cuboid joint opened, and the attachments of the bone to those adjacent severed. The wound is then united by sutures, and a sufficient number of straps applied to give support to the part.

The indications for after-treatment are: perfect rest of the part, a free exit for discharges, and the support of the patient's strength. To insure the first, nothing is better than the plaster-of-Paris bandage, going round the foot and upon the leg, leaving the heel bare. This gives a firm support for the leg and foot, on which the limb may rest with the heel downward, so that the discharges may drain through the lower portion of the wound. Union by first intention sometimes occurs through nearly the whole line of incision. Ice or cold-water compresses should be applied at first, and afterward the part dressed according to the requirements of the case, and some detergent lotion, as a solution of carbolic acid or sulphate of copper, be injected daily through such part of the wound as may remain ununited. Those who adopt the theory of the septic properties of the atmosphere would be careful to keep the vicinity of the wound constantly disinfected either by carbolic acid or a chlorinated wash. The after-treatment has been rather fully dwelt upon, because there is great reason to believe that a good share of success in this operation depends upon its observance.

Mr. Holmes refers to the opinions of Sedillot upon the *evidemment des os*, and Ollier upon subperiosteal resection, but does not regard those operations as giving better results than entire excision, while being more complicated.

There are other notices of resection of the entire calcaneum on record, but the above are nearly, if not all, those which have been fully reported. Roux, of Paris, excised this bone; Dupuytren, in 1833, related four cases in which he had operated;¹ Mr. Hamilton operated in 1856; Mr. Thomas H. Wakley in December, 1847;² and it has been adopted by Fergusson, Teale, Humphry, Cann, Pemberton, the two Lausdowns, Folker, Gibb, Erichsen, and others.

In Heyfelder's work upon resections (p. 182) is given Linhart's description of a foot from which the *os calcis* had been removed three years before (case 23 of the table). It is as follows:

"The foot was slightly curved, the sole flat, the projection of the heel absent; at this point was a λ -shaped scar. Directly under the skin, in the region of the heel, was a tough, fibrous callosity, with which the *tendo Achillis*, as well as the tendons of the *flexor brevis digitorum*, *abductor hallucis* and *digiti minimi*, gradually blended. This fibrous tissue was also lost in the fascia, resp. *ligamentum lanciniatum internum*. The sheaths of this latter ligament were dry, and the contained sinews mostly united with them. . . . On the posterior border of the surface of the astragalus which unites with the tibia was a row of warty and spinous osteophytes. The under surface of the body of the astragalus which articulates with the calcaneum was united, by a soft, loose connective tissue, with the callous substance in the heel to which reference has previously been made. The callosity could be easily detached in several places, and the surface was completely denuded of cartilage. In its stead were broad, fibrous bundles, and, where these were wanting, the carious bone lay bare. The internal articulating surface on the neck of the astragalus (for the *sustentaculum tali*) was gone, and in place of the cartilage was a fibroid mass. The compact substance of

¹ Mott's *Velpeau*, vol. ii., p. 760, et seq.

² Successful removal of *os calcis* and astragalus. London *Lancet*, Nov. 2, 1867.

the bone seemed to be flinched and yielding. The posterior surface of the cuboid had approached the body of the astragalus, and, while this surface was neither denuded nor softened, the opposite portion of the neck of the astragalus was softened and rough. The inner half of the external lateral ligament (Schleuderband) was united with the common fibrous cicatrix. A process of the callosity, which has been mentioned, extended toward the cuboid, to which, as well as the body of the astragalus, it was united. This served to strengthen the cuboid, although an imperfect substitute for the ligamentum calcane-cuboid-plantare. The smaller joints of the foot were rendered almost immovable by means of Kurzzellige (?) bands of attachment.

"The most striking feature presented in examining the bones of the foot, was the absence of the plantar arch, which, in the normal condition of the bones, is formed by the union of the astragalus and os calcis with the scaphoid and cuboid. Like the pes valgus, the foot was turned outward and upward. The inner margin of the foot had, like the sole, lost its curvature. The eversion just mentioned existed only in the articulation between the astragalus and scaphoid (which joint was deprived of its strong plantar ligament), while the lesser curvature of the five metatarsal bones was not altered (differing in this respect from the similar deformity of the pes valgus). The head of the astragalus was, to a great extent, separated from the scaphoid and looked toward the sole, the articulating surface of the astragalus was not smooth but rough, and covered with short, firmly-attached fibrous filaments: where these fibres were wanting, the cartilage covering the facet seemed ossified. The astragalus was firmly fixed in the position which has been described."¹

Any operation which saves a valuable limb, and restores it to normal usefulness after, in some cases, an inactivity of many years, cannot but cause feelings of deep interest. An amputation for disease, however necessary, is yet a confession of inability to arrest that disease. It is hardly indulging the imagination to say that every stump, however firm or well rounded, still seems to utter a mute appeal for the advent of

¹ Lehrbuch der Resectionen von Dr. Oscar Heyfelder, etc. Wien, 1863.

that period in medical knowledge when therapeutics and manual aid can accomplish their utmost in reducing the necessity of amputation to the lowest degree.

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IV.—SPRAINED ANKLE.

On the Serious Consequences which result from the Neglect of slight Injuries of the Ankle-Joint. Illustrated by Cases. By LEWIS A. SAYRE, M. D., Professor of Orthopædic Surgery, and of Clinical Surgery in the Bellevue Hospital Medical College.

[Being a Clinical Lecture delivered at Bellevue Hospital, Nov. 16, 1868.]

GENTLEMEN: I desire to speak to you to-day upon the serious consequences of neglecting slight injuries of the joints, and my remarks will have especial reference to the ankle, as it is this articulation that is above all others exposed to accidents of this sort; and the case before you is typical in its causation and progress. I shall, moreover, demonstrate to you the plan of treatment I pursue, which is somewhat at variance with that generally adopted, and exhibit and relate to you cases exemplifying the degree of success you may anticipate by this method of procedure.

I have often expressed the opinion that injuries of joints were dangerous in proportion to their original insignificance, by which apparent paradox, I mean this: that serious injuries *compel* attention and slight ones are neglected, and, generally speaking, the more slight the accident the more apt to be neglected. If an injury is severe—a dislocation, a fracture involving a joint, a severe sprain even, for example—it cannot be overlooked or neglected; surgical aid is indispensable and immediately sought for, and generally a cure results after a reasonable time. When, however, a person re-

ceives what is termed "a slight sprain of the ankle," the amount of mischief resulting from its neglect is often extreme, the limb frequently being sacrificed as the only cure for a chronic inflammation of the joint involved.

Let us consider for a moment how this comes about. I need not detain you with any extended remarks upon the anatomy of the joint, but simply call to your mind the admirable provision which is made against injuries from concussion. Notice how both surfaces of the astragalo-tibial articulation are protected by cartilage, which is elastic, non-vascular, receiving its nutrition by imbibition from the synovial membrane and from the vessels of the articular lamella, and which consequently takes on inflammatory action with great reluctance. The malleoli, however, which stand as guards on the sides of the joint, are not so well protected, because in the normal movements of the foot they are not subject to pressure. You have probably all at some time twisted your ankles in walking, and you cannot have failed to notice how instantly the malposition of the joint is followed by a spasm of the muscles of the leg; in accordance with a peculiar kind of sensibility which Mr. Barwell styles "the joint-sense."

When one thus sprains his ankle, I believe that beneath the synovial membrane, or between the cartilage and the bone, is produced a slight extravasation of blood, quite analogous to the "blood-blister" which is formed upon the external surface whenever the skin is severely pinched but not broken.

Such a "blood-blister" is considered as insignificant under ordinary circumstances, if it is allowed immediately to heal. If, however, the "blood blister" is constantly irritated by friction, an ulcer is formed which rapidly increases in size and involves the deeper tissues. This, I believe, is exactly the morbid process going on in one of these neglected sprained ankles. The small quantity of blood effused behind the synovial membrane, or between the cartilage and the bone, would speedily be reabsorbed if sufficient rest were allowed to the part; but there is no swelling and little pain to give warning of the mischief done, and the patient does not stop his usual walks and exercise. The "blood-blister" becomes irritated and increases in size, finally obliging him to lie by for a short time.

The trouble apparently disappears, and he resumes his avocations; a slight over-exertion, however, brings back the same train of symptoms, namely, exhaustion, stiffness, pain, tenderness, and perhaps swelling. This is repeated again and again, as often as rest allays and exertion awakes the morbid process; the attacks becoming more severe and prolonged, till at last the condition of chronic inflammation is reached. The liquid now contained in the joint is abnormally abundant and is changed in consistency; instead of the clear synovia, there is a viscid substance. To this, in part at least, are due that peculiar distention and "boggy" feel which the joint now presents.

Ordinarily suppuration very rapidly supervenes upon the above-described condition of the articulation. The cartilages ulcerate, and caries of the adjacent surfaces of the bones is set up. The pain is often excruciating, as is generally the case when cartilage is undergoing disintegration.

As a result, the constitutional disturbance is quite severe; the pain produces directly sleeplessness and anorexia. The muscles affecting the articulation are constantly "on guard" to fix the joint and prevent any attrition of its surfaces. This constant tension causes an atrophy of the limb both above and below the joint; though, in the latter situation, it may be obscured by the swelling. At night, when the sleep has become so sound that the muscles relax their spasmodic contraction, motion will take place in the joint, and the patient awakes with a sudden, piercing shriek. So quickly do the muscles resume their conservative contraction, that, by the time the nurse has reached the bedside, the patient is again asleep or is unconscious of the cause of his awakening.

This pressure of the joint surfaces, although painful, is less so than the motion which would occur if the muscles were not thus contracted, and it very much increases the destruction of cartilage and bone; and you will find, in *post-mortem* examination of the parts, erosion of these tissues farthest advanced in those points where the pressure of muscular contraction is greatest.

When the joint is thus filled with a liquid, which is causing disturbance as a foreign body, one of two terminations is necessary—the absorption or evacuation of this liquid. The

character of the liquid is such as to render its absorption very unlikely, and the chances are diminished by the debilitated condition of the patient's system, which only increases the severity of the difficulty.

Still we have a chance of success by fixing the joint in such a manner as shall relieve the pain and defend it from the attrition, and allow our attempts to renovate and invigorate the system really to take effect, so that absorption shall be possible. If, in addition, we apply some apparatus, which shall permit the patient to take out-of-door exercise without disturbing the rest of the articulation, we shall have done the best that can be done, and, fortunately, our efforts will often be crowned with success. If, however, we do not employ such precautions, and often, in spite of them, the disease proceeds to ulceration of the bone, and, if we do not make an exit for the pus, it will eventually make one for itself. In the mean time, however, long and tortuous sinuses will have formed, the pus burrowing this way and that among muscles and between fascia, so that these tissues are involved, while by the long-continued action of the pus the disease of the bones becomes greatly extended. Much of this trouble is avoided by opening the joint when we are convinced that any considerable amount of pus is contained within its cavity. The old established doctrine of the great danger of opening a joint is, for the most part, fully accepted to-day. I must, however, express my dissent from this general belief. Of course, no one would dream of opening a joint so long as there was a probability of the integrity of the articulation. But, when the articular surfaces are wholly or in part destroyed, then, I say, the characteristics of a joint are also destroyed; there remains nothing but an abscess of a joint, which is to be treated in the same manner as an abscess elsewhere, or, more exactly, as any abscess connecting with bone.

Now, the manner in which I accomplish the various indications I have pointed out above is as follows: When I still have hope of preserving the joint intact, I employ an instrument which I have constructed for this purpose. This instrument consists of a firm steel or hard rubber plate, made to fit the sole of the foot; at the heel is a hinge-joint, and attached

to it a rod, slightly curved at the bottom, and extending up the back of the leg to near the knee. Over the instep is an arch, like the top of a stirrup, with a hinge-joint at its summit, from which springs another rod, which runs in front of the leg, of equal length with the one behind. These rods are made with a male and female screw, or ratchet and cog, for extension, and connected at the top by a firm band of sheet iron, on one side of which is a hinge, and a lock on the other, like a dog-collar. (See Fig. 18.)

The instrument is applied with firm adhesive plaster, cut in strips about one inch in width, and long enough to reach from the ankle to two or three inches above the tubercle of the tibia, and placed all round the limb, as in Fig. 19.

The plaster is secured in its position, to within two or three inches of its upper extremity, by a well-adjusted roller, as seen in Fig. 20.



FIG. 18.



FIG. 19.



FIG. 20.

The instrument is fixed, and the foot firmly secured by a number of strips of adhesive plaster, as seen in Fig. 21.¹ A roller should be carefully applied over this plaster, to prevent its slipping, and the ends of the plaster at the top of the instrument turned over the collar, which has been previously locked, just tight enough to be comfortable, and secured by a turn or two of the bandage, as seen in Fig. 22. With the instrument accurately adjusted, the extension can be regulated by the key and cog, so as to make the patient comfortable.

¹ The figures represent the instrument as applied to a joint which has been setoned.

If, however, the symptoms show the system to be suffering from the poison of the pus retained in the joint, or if, the joint being open, the patient is sinking under the drain of prolonged suppuration, the diseased bone should be at once removed, and a perfect drainage established, so that no pockets or sinuses can be formed. If this latter accident be allowed to occur, the disease of the bone will not be arrested, and the operation will, therefore, be useless.

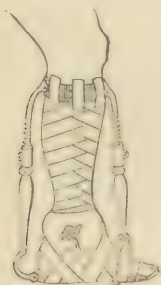


FIG. 21.

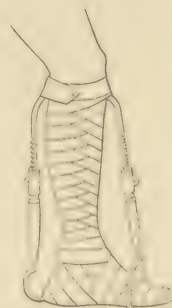


FIG. 22.

Now, you cannot in the ankle exsect the bone, as you can at the shoulder or hip, by a straight incision. In these orbicular joints the operation is simple; you have but to cut down to the bone, open the capsule, throw out the head of the bone through the "button-hole" slit, remove it with the chain-saw, and finish with the rongeur forceps, if necessary. But in the hinge-joints, as a rule, and especially such complicated ones as the ankle, you cannot safely operate in this way. To make the necessary incisions, the muscles and vessels must be divided transversely, and so much damage is thus done as to seriously interfere with the success of the operation. The elbow-joint is the exception to this rule, the ordinary operation for orbicular joints, viz., a single incision parallel with the muscular fibres and vessels, being applicable to it. In view of this, I have for many years refused to operate by exsection upon any of the hinge-joints, except the elbow. The method which I substitute I shall now proceed to demonstrate to you, as, by so doing, I can much more clearly explain and more firmly impress the essentials of the operation than by any amount of lengthy description.

The history of the case before you is, in brief, as follows :

Lewis R—, aged nine, last winter, in December, '67, or January, '68, sprained his ankle while skating. For some time he experienced no trouble in the joint, but eventually it began to swell, and the disease ran the usual course, till he was admitted to Bellevue, July 11, 1868, with an open joint. On the 22d of that month I removed what dead bone could be found, and passed a seton of oakum through the joint from side to side, below the malleoli. The joint was fixed by a plaster-of-Paris splint, which was changed in a few days for one of leather. The case remained under my care but a short time ; the surgeon to whose care he next passed, holding different views regarding the treatment of these cases, removed the seton a month after it had been inserted, and since then the treatment has been simply poultices and stimulating dressings. The surgeon at present having the case in charge has kindly consented to surrender the case to me "for one year, at the end of which it is to be returned for an amputation." You see, he has no faith in my plan of treatment.

You will notice the foot and ankle present the usual appearance found in chronic inflammation and suppuration of this articulation, complicated with caries of the tarsal bones. The usual contours of the joint are obliterated, and it presents an irregularly rounded tumefaction, nearly twice the size of the opposite ankle, of a purplish color from venous congestion, which has been aggravated by long-continued poulticing of the part, and a "boggy, doughy feel," with several open sinuses, through which the probe readily passes to dead bone. I would remark, in this connection, that the long-continued use of hot poultices to a joint in the condition of this one is always injurious. The heat solicits more blood to the part, and the relaxing effect of the fomentation favors the passive congestion of the capillary vessels, and thus adds to the œdematous and "boggy" condition of the part.

While the patient is under the chloroform, I shall remove the carious bone *sub-periosteally*. If I destroyed the periosteum, I should defeat the chief object of my operation, namely, the regeneration of bone and the formation of a *movable joint*. Into the sinuses already existing I pass this instrument, Fig. 23, which

I have formerly called an "oyster-knife," as its form most resembles that of the implement used to open oysters, but it is more properly called a periosteal knife, or elevator. The blades are strong and wedge-shaped, the edges not being sufficiently



FIG. 23.—SAYRE'S PERIOSTEAL KNIFE.

sharp to cut the soft parts. With it I can enucleate the diseased bone without fear of lacerating the vessels, periosteum, or other important parts. Make your excavation thoroughly, seeking to remove not only all the dead bone, but especially the gelatinous matter so abundant in these diseased joints. In this case you see I have removed, besides a mass of detritus, a piece of carious bone about the size of a hickory-nut, which is from the lower end of the tibia, including a part of the articular surface. If I can, I generally, before finishing the operation, place my finger within the joint, to more perfectly assure myself that I have reached all the diseased structures.

Now I draw completely through the joint and also through the other sinuses a large seton of oakum, saturated with Peruvian balsam, letting the ends extend beyond the ulcers for some inches. The advantage of the oakum I will mention in a moment.

The operation proper is now complete. Place the foot in a comfortable position, and at a proper angle with the axis of the limb, and fix it there by an anterior splint of plaster of Paris, from which arms extend around the foot and leg below and above the wound, so as to leave the latter entirely free for daily dressing.

When the plaster has "set," envelop the joint with a thick pad of oakum, and bandage the foot and ankle as firmly as possible. The reason why I insist upon the oakum is this: it is elastic and makes an equable pressure, but at the same time is always pervious for the escape of pus. You know

how dense compressed cotton is, how that it cannot be wetted thoroughly for a long time; lint has much the same qualities. I sincerely believe that the life of many a soldier was lost during the late war, simply from the lint with which his wounds were dressed, or rather plugged. Beyond this advantage, oakum is particularly serviceable as a seton by reason of its strength, and the tar with which it is so thoroughly impregnated prevents its becoming readily foul. Therefore, gentlemen, I use lint only to arrest or prevent hæmorrhage, and never after suppuration is fully established.

In this case, then, I have accomplished what? By my excavation I have removed the essential morbid cause; by the splint I prevent motion, which would be a cause of a relapse; and by the firm pressure I have given the enfeebled and stagnant circulation of the parts the best possible support. The seton will be moved daily, and the soiled part cut off; you can easily twist on more oakum, and thus continue it as long as necessary, and what *débris* of carious bone has been left behind will be drawn out entangled in the fibres of the oakum. By-and-by, when the reparative process shall have been fully established, the extension instrument which I have already described to you will be applied and the boy allowed to go about. Even before that, if your patient is of sufficient age to take proper precaution against injury, he may be allowed to go about on crutches a little. In this event, however, you will be especially careful that the bandaging be applied with sufficient accuracy and firmness to counteract the congestion from gravitation of blood to the part.

I hope, gentlemen, before this winter session closes, to be able to present you the result of the case I have just operated upon, but a longer time may be necessary for a perfect cure. I have, however, here, several persons upon whom I have already operated, and who, living in the city, have consented to come before you in order that you may see what degree of success you may anticipate. And first let me present one which should follow the one just operated upon, because they both exemplify the danger of too speedy removal of the setons. This one, moreover, will satisfy any doubt which may have

arisen in your minds, regarding the propriety of repeating the gouging and setoning process.¹

CASE II.—John Rush, Davenport, Iowa, aged 27. Laborer. In November, 1866, while ploughing, he sprained his left ankle. He did not, however, experience sufficient inconvenience from the injury to prevent him from working until four months had elapsed, although during this interval he was aware that the joint was not quite sound. From the time he was obliged to give up work until he came to New York, in April, 1868, he had been under surgical treatment. His attendant advised him, last spring, to come to New York to consult me. The foot presented the general appearances already described in relating the other cases. Below both malleoli were openings, and in each dead bone could be recognized by the probe. Still another fistula opened on the outer side of the tibia, about five inches above the articulation. The general health of the patient was considerably impaired, and he was quite thin.

At that time, April, 1868, I dug out a large quantity of carious bone, consisting of the scaphoid bone, a part of the astragalus, and pieces which appeared to be parts of the smaller tarsal bones. The calcaneum was then quite sound. The dressing, with the seton and plaster-splint, was applied as you have already seen done. Three weeks after the operation I sent him to this hospital, as his lodgings were not suitable for his wants. The surgeon, to whose care he fell, removed the plaster-splint at once, and four weeks later removed the setons. This change of treatment was due to the fact that the surgeon holds the opinion that *motion* is necessary to the cure of the joint, in order to excite a healthy action. Now, I have already insisted upon the absolute necessity of *rest*, in certain stages of the diseased joint, but there is a period where motion becomes necessary, and I should do well, I think, to explain to you where motion is injurious and where it is demanded.

So long as there is active inflammation in a joint, motion is injurious, and rest absolutely necessary. In the first stages of

¹ January 6, 1869, the boy was examined before the class; he was able to bear his weight upon the ankle, and there was motion at the new joint.

inflammation of any joint, rest is also absolutely necessary, and, in fact, is the essential element of the treatment—and, as long as acute pain is produced by pressing the synovial surfaces and articular cartilages together, rest must be enjoined, or, if motion of the joint is requisite, in order to prevent ankylosis, then this motion must be always accompanied with extension in order to relieve this pressure. But, when pressure can be borne without pain, and the difficulty in motion depends upon the contraction of tissues around the joint from want of use or from deposits, as the result of an antecedent inflammation—then motion—passive motion—applied with discretion, is just as much a part of the treatment, as rest was in the anterior stage of the disease.

So, also, when a joint has been opened for suppuration and caries, so long as there is dead bone remaining, and excessive suppuration, rest is imperative, and motion injurious; but, when the dead bone has all exfoliated and been removed, the pus diminished and of a healthy character, then the setons can be removed, the sinuses allowed to close up, and passive motions commenced, which can be increased with judgment and discretion, in order to make a new or artificial joint in the new bone formed from the original periosteum, which, as I stated to you before, must always be left for this purpose, when making your resections.

When I came on duty, July 1st, I found the patient's foot presenting nearly the same appearance as at first. The premature removal of the setons had allowed the accumulation of pus within the joint, and the caries had been reëstablished. Examination with the probe showed the calcaneum to be now involved. The operation of excavation was repeated, and a large portion of the os calcis removed, a seton passed through the joint, another from each of the openings on the side to an artificial opening at the point of the heel, so that, in any position the patient might assume, the drainage would be perfect.

You see the present condition of the patient. The setons have been all removed, and the wounds are closed. There is no pain in the joint. You see the patient walks without limping, showing there is no tenderness. The fistula on the leg

and that on the point of the heel are so perfectly healed that the cicatrices can be with difficulty found. The contour of the foot is so perfect that any one would naturally doubt that so much bone had been removed. This is, I think, evidence that the bones of the tarsus have in some sort been reproduced by the periosteum. I have never had the opportunity of examining, *post mortem*, any of these reproduced ankle-joints.

This man now appears to be perfectly cured, and you might think treatment should be suspended. On the contrary, the limb must be carefully bandaged for months to come, until all the discoloration from congestion shall have disappeared. If you neglect this precaution, there is great danger of relapse. You will notice in this case, when I let his foot hang down, that the skin becomes discolored from capillary congestion; and I therefore reapply the roller with considerable firmness, in order to support the circulation in these new tissues, and this accurately-adjusted compression must be continued for months after the cure has been apparently complete.

CASE III.—*Suppuration and Caries of both Ankle-Joints from Injury; double Talipes-equinus; Operation: Recovery, with Motion.*¹

Elizabeth Bruen, æt. 16. Admitted to Bellevue Hospital, January 29, 1864. Her father died of phthisis. In 1862 she sprained her right ankle. The injury produced a chronic form of inflammation, and in two months it had increased so much that she could bear no weight at all upon it. She now moved about by hopping on the well (left) foot, and in about six weeks she had excited the same form of inflammation in that one as in the other. Two years after the first injury, when admitted to the hospital, her appearance was cachectic and miserable. The disease in her ankles had gone on to the formation of abscess, and several sinuses led into the joint, through which disintegrated bone had escaped.

The gastrocnemii of both sides were so contracted as to ex-

¹ Cases III, V, and VI, were included in a report to the American Medical Association in 1865, but are again presented to show the permanence of the cure.

tend the foot nearly to a straight line with the tibia. She could not bear the slightest pressure on either foot, and could not use crutches, as she could not poise herself on the ends of her toes, which were the only points that could touch the floor when in the erect posture. She was, therefore, compelled to move about upon her knees, as seen in Fig. 24, which also shows the sinuses connecting with either joint.



FIG. 24.

All active disease about the joints had subsided; but the discharge from the various sinuses was considerable, and, by probing them, several small pieces of bone escaped.

On the 17th of February, 1864, in the presence of the class at this Hospital, I divided subcutaneously the tendo Achillis on both sides, and restored the feet to their natural angle with the legs. Leather splints were then applied, to retain them in this new position until the 24th of February, just seven days after the section of the tendones Achillis, when the above-described instruments were applied in the presence of the class.

The sinuses were enlarged, and a seton of oakum drawn through the ankle-joint, as indicated in Figs. 19, 20, and 21. A wad of oakum thoroughly wet in cold water was placed over each ankle, and secured by a firm roller. The screws were extended, and the difference in the appearance of the ankle before and after is well represented by comparing Figs. 21 and 22.

These drawings were taken from life by Dr. Henry C. Eno, House-Surgeon of Bellevue Hospital, and are as accurate as any photograph could be.

As soon as the instruments were properly adjusted, she stood upon her feet, without the aid of crutch or cane, for the first time in two years, and without any pain whatever; but the instant the screws were shortened, the pain was most intense.

She was directed to have the oakum around the joints kept constantly wet with cold water, and firmly supported by a bandage, and changed as often as necessary. The seton was to be pulled through, and the soiled part cut off daily, and to be continued as long as any bone was exfoliating, until the matter should change from its sanious condition to a consistent pus, when it was to be removed, the wounds allowed to heal, and, if possible, passive motion made. If motion could not be attained, then the feet were to be ankylosed in their natural position, deeming that a stiff ankle was better than an amputation.

The following notes of the case, copied from the hospital-records, which were taken by Dr. Irving W. Lyon, House-Surgeon, now of Hartford, Connecticut, will show the progress and the result of the treatment:

"*February 28.*—She is very comfortable, and there is no pain about the ankles.

"*March 15.*—Has been out of bed most of the time since the operation; but remained sitting at the bedside until to-day, when, with the aid of crutches to balance the body, she walked about, bearing her *entire weight* upon the feet; the extension made by the instrument being so perfect as to prevent pressure upon the joint surfaces.

"*April 6.*—Apparatus removed from both feet, and motion made at the ankle-joints, which are perfectly free and movable, but pressure is yet *very painful*. The apparatus is reapplied. It should be stated that the patient was put upon the best diet the hospital could afford, together with cod-liver oil.

"*May 7.*—The adhesive plaster having become disarranged, necessitated its readjustment. It was now discovered

that the sinuses had all closed completely ; but pressure while extension was off still gave her some pain. Her general health very materially improved.

"*July 20.*—All extension being removed, she is able to stand erect without pain in either ankle ; but attempts at walking occasion a considerable amount of pain and uneasiness. The motions of the ankles are all unimpaired. Her health is thoroughly restored, and she has not only grown taller since her admission, but has also grown much more fleshy, and will weigh at least thirty pounds more now than in February. The splints are reapplied, and will require to be worn a little while longer to complete the cure."

In a foot-note I find the following record : "It should be mentioned that since the 15th of March (the date of her commencement to walk upon the shoes) she has continued to walk upon her feet, bearing the entire weight of her body upon them, and only needed crutches to supply the place of the muscles of the leg, which, on account of being confined by the apparatus, were unable to balance the body."

Dr. Lyon left the hospital about this time, and I can find no further notes of the case on the records of the institution. She wore the instruments, however, until about the middle of January, 1865, when they were permanently removed, and a plaster cast taken of both her legs and feet, from which Figs.

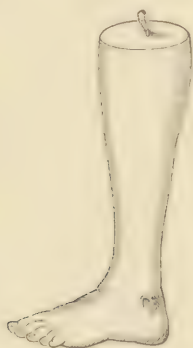


FIG. 25.



FIG. 26.

25 and 26 are copies. The motions are almost perfect, and she can walk without pain.

From this time she continued to improve steadily, the wounds cicatrized perfectly, and for three years she has been able to take long walks. She lodges in the sixth story of a building, and has to go up and down the stairs several times a day in attending to her work. You can see for yourselves how perfectly free from halt her gait is.

Last spring, in crossing the ferry from Brooklyn, she hurt her right ankle, and an abscess resulted, which opened in June last. This connects with the new joint, and is still open, and I can touch dead bone with the probe. She states she experiences no inconvenience from the ankle, save when the opening closes; at these times she feels uncomfortable, and opens the wound, and the symptoms disappear. You see, then, before you, what would formerly have been deemed impossible, a person walking without pain with an open ankle-joint. She prefers letting the bone work out in its own time to discontinuing her work for an operation.

CASE IV.—This little boy, John Francis Kennedy, came under my care, November 13, 1865, for chronic synovitis of the left ankle-joint, which had been caused by an injury received when jumping, five months before. At the time I saw him, the ankle was swelled and distended by synovia, and abnormally hot. The limb above was somewhat smaller than its fellow, and the foot somewhat shorter. Pressure exerted on the tibio-tarsal articulation caused pain, which was relieved by extension. I applied an angular tin splint, placed on the anterior surface of the leg and foot, and fastened it with adhesive plaster, thus fixing and extending the joint. In addition, the joint was painted with tinct. iodine, and compressed with sponges. The disease progressed, however, till, after three months' treatment, three openings formed, which discharged strumous pus. I then passed three setons through the joint, dressing the ulcers with balsam of Peru, and applied the extension-splint. The setons remained in a long time; one for eighteen months. Numerous small pieces of bone were discharged, and on the 5th of July, 1867, a piece of the astragalus, about the size of an almond, was exfoliated. The discharge then became healthy, and after about six months ceased entirely. The joint has now considerable mo-

tion. The deep cicatrices mark the position of the setons. The foot is somewhat flattened in the instep, as compared with the sound one, but the motions are nearly perfect. (See Figs. 27 and 28.)



Fig. 27.



Fig. 28.

CASE V.—*Suppuration and Caries of the Ankle-Joint ; Operation ; Seton ; Extension : Recovery, with Motion.*

In January, 1855, I was sent for by Dr. L. C. Ferris to amputate the leg of Ella Stanley—aged 5 years—for disease of the right ankle-joint. In March, 1854, ten months previous, she had fallen from a chair, striking her right ankle against the sharp corner of a bedstead. The injury was immediately followed by considerable swelling and very great pain. The pain soon subsided, but the swelling continued.

For two or three weeks she seemed tolerably well, but at the end of that time she began to limp badly. She was then put upon crutches, and various lotions applied to the foot and ankle.

The disease, however, continued to progress, her general health became much affected, with loss of appetite and sleep, and she was greatly emaciated. The limb was much smaller than the other, but the foot and ankle were swollen into a shapeless mass. In November she began to have repeated chills and hectic fever, and in the early part of December the ankle opened in several places, giving exit to a large amount of ill-conditioned or strumous pus. Her general health be-

came much impaired, and in January, 1855, I was sent for to amputate the limb. Her suffering was most intense; she would not permit the limb to be handled until she was under the influence of chloroform, when crepitus was readily detected; several sinuses around the joint discharged quite freely a curdy pus mixed with a material very much resembling quince-jelly.

A probe passed into one of these sinuses, just posterior to the internal malleolus, went into and through the joint, making its exit at a point in front of the external malleolus. A strip of linen (in default of any thing better) was torn from the child's dress, passed through the eye of the probe, and drawn through the joint.

A piece of firm sole-leather, cut to fit the front of the leg, and dorsum of the foot, having been thoroughly soaked in cold water, was then applied over the top of the foot, and secured by a nicely-adjusted roller; the foot was firmly extended so as to separate the tibia and astragalus, and the roller then carried up the leg, over the leather, which, when dry, served to extend the joint and at the same time prevent all motion. This gave her great relief, and her limb could be moved with comparative comfort. The child was put upon the most nutritious diet, with quinine, cod-liver oil, and iron.

The dressings were removed and changed as often as they became soiled with pus, and, in the progress of the case, compression with sponges and cold water was resorted to. Her improvement was most marked and rapid. At the end of a few weeks the instrument was applied, as in the other cases, and with the same happy results, enabling the patient to walk with crutches and obtain the benefit of out-door exercise, which added materially to the improvement of her general health.

The setons were retained nearly ten months, being gradually reduced in size as the bone ceased to exfoliate and the pus became more healthy, until for a number of weeks they were hardly larger than a single thread. When they were finally removed, the sinuses healed in a few days, and passive motion was commenced as in the other cases. The patient continued to wear the instrument for nearly a year after she

was perfectly well, as a means of prevention against accident, and then left it off entirely.

It is now eleven years since this case was operated on, and she is as well in the one leg as the other, and the motions are almost as perfect. The foot is one size smaller than the other, and the leg a little shorter; but the limb is perfectly developed, as represented in Figs. 29 and 30, which were taken from a plaster cast of her limb, and which also represent the cicatrices where the seton passed through the joint.

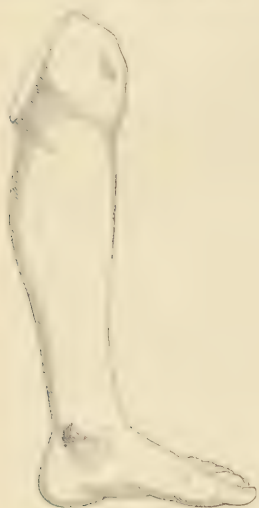


FIG. 29.



FIG. 30.

This cast was taken more than five years ago, since which time her limb has continued to increase, until it is now as well developed as the other, and the motions are equally perfect; in fact, she is the prize female skater of the city.

CASE VI.—*Caries of the Ankle-Joint; Seton: Recovery.*

B. W., aged 7, of healthy parents, and whose brothers and sisters were all healthy, had himself always enjoyed good health, until in the summer of 1854, when he injured his left ankle by a fall.

The joint swelled immediately, and was quite painful; but still did not confine him to his bed until after four or five days. It then became so painful as to prevent motion, and

for a number of days he was treated by perfect rest, and alternate applications of hot and cold water. As he made no improvement, after a few weeks his ankle was blistered, and this was repeated every eight or ten days for a great number of times, but without any improvement.

His general health became much affected, with loss of appetite, and of sleep; he became greatly emaciated, and suffered intense pain constantly, which was greatly aggravated at night by frequent spasms, or "jerkings of his foot" as he described it.

The development of the leg and thigh on the affected side became arrested, the ankle and foot very much swollen and shapeless, a number of sinuses formed, leading into the joint, and the bones crepitated when the joint was moved.

Dr. Valentine Mott saw him in July, 1855, and advised amputation as the only means of saving his life. The mother, however, would not consent to the operation, and I was called to see him in consultation with Dr. David Green in October, 1855. Several sinuses then existed, leading into the joint, through which the probe was passed without difficulty, but coming in contact with carious bone in almost every direction.

On the 21st of October, 1855, I opened the joint freely on either side by connecting some of the sinuses, and found the joint carious throughout.

Two setons of oakum were passed through the joint, the one laterally, and the other antero-posteriorly; and the foot extended in the instrument as in the case of Elizabeth Bruen, above described. As the seton was pulled through, a number of small pieces of bone were drawn entangled in its meshes.

When he recovered from the effects of the chloroform, he could bear pressure on the foot without pain, and would permit it to be handled in any direction without complaint, although, before its application, he would not permit it to be touched, and it was impossible to move it in any direction, even in the most careful manner, without giving him intense agony.

He slept quietly the night after the operation, without any

anodyne, although he had been compelled to use anodynes freely for many months, and never resorted to them again during the time he was under treatment.

His general health began to improve almost immediately from the time of the operation and the application of the instrument, his appetite returned, and he was able to ride out in the open air with comparative comfort. The setons were pulled through daily, and the soiled parts cut off; and the whole ankle constantly surrounded with oakum saturated in cold water, and sustained by a tight bandage.

For two or three months small pieces of bone were frequently found entangled in the fibres of the seton, when pulling it through; but the discharge gradually diminished in quantity, became more consistent in character, and, as it did so, the setons were gradually reduced in size, until, finally, they were a mere thread or fibre. At the end of eleven months from their first insertion they were removed entirely, and the sinuses closed up in a short time after, never to be reopened.

The extension was continued for nearly two years before it was removed permanently, although he had walked about for many weeks before the instrument was dispensed with. As soon as the sinuses had become closed, and he could bear moderate pressure upon the foot, when the extension was off, without suffering pain, I commenced passive motions daily, by acting on the anterior and posterior screws alternately, thereby imitating the natural motions of the joint. In about two years from the first operation, the instrument was removed permanently, when he could walk without difficulty, having considerable motion in the affected joint. This motion has very materially increased, and is now (nearly ten years after the operation) almost as perfect as the other. The foot is smaller than the other, and about half an inch shorter, but he supplies the deficiency by a thick sole inside his boot, and can run and skate with any of his playmates without the deformity being detected.

Drs. Mott, Stephen Smith, and other surgeons of this city, saw this case when under treatment, and therefore know that the setons passed through the ankle-joint; but as there has been some question about it by others who have not seen the

case, I have had his foot daguerreotyped on both sides by Mr. Gurney, and the cicatrices on either side, giving the entrance and exit of the setons, show conclusively that they did pass through the ankle-joint. (See Figs. 31 and 32.)

FIG. 31.



FIG. 32.

You will observe, gentlemen, that all the cases I have presented to you, as well as the one just operated upon, have been the result of injuries which were at first so insignificant as not to attract especial attention, or for some time to prevent the patient from taking his usual exercise; and you therefore see the necessity of compelling your patients to give immediate and positive rest to the part, until all pain shall have subsided, in all cases of even the slightest sprain of the ankle-joint, for, if neglected, the result is more serious than if they had fractured the leg.

V.—FRACTURED CLAVICLE.

A Method of dressing Fractured Clavicle. By LEWIS A. SAYRE, M. D., Professor of Orthopaedic Surgery, Bellevue Hospital Medical College, and Professor of Clinical Surgery, Bellevue Hospital.

[Being part of a Clinical Lecture delivered at Bellevue Hospital.]

I wish to call attention to a method of dressing fractured clavicle, which, so far as I know, is not described in any work upon the subject. The plan is not original with me, or new, as I have used it many years, having first done so at the suggestion of a surgeon residing, I think, in Western New York, but whose name I regret that I am quite unable to recall.

All surgeons are agreed as to the indications for the reduction of a fractured clavicle; namely, that the shoulder be carried upward, outward, and backward. But the fulfilment of these indications and the retaining the parts in position after the reduction have proved problems of great difficulty. A very large variety of apparatus has been devised by different surgeons, but the success attending their use has so little compensated for their inconvenience, that in this country, at least, they have very generally been superseded by the *treatment by position*; that is, the confining the patient to bed, keeping him constantly upon his back, with the head, neck, and shoulders supported by pillows in such a manner that the weight of the injured shoulder shall draw the outer fragment into proper position, and union be thus brought about.

Now, I find this plan of treatment quite irksome to patients.

In the first place, the position is very fatiguing. Again, a man of business is generally unwilling to abandon his occupations for the two or three weeks necessary for the union of the bone; and, with poor men, it is often of vital importance that the support derived from their labor should not be taken from their families for even so short a time as this. Beyond these objections on the part of patients, it has been my experience that, if the point of fracture be near the outer end of the clavicle, the action of the deltoid will frequently prevent union when the postural treatment is employed. This is the case with the patient whom I am about to dress, who has been for three weeks confined to bed without accomplishing the desired end. The fragments are apparently as movable to-day as on the day the fracture was received. You will observe that I rub the fractured ends against each other for the purpose of exciting a fresh inflammation; otherwise, there is danger that in this case we would not get bony union of the fracture, so long a time having elapsed since the accident.

The dressing is prepared by cutting from strong adhesive plaster—that spread on Canton flannel, or jeans, is the best—two strips four to six inches in width, and longer by half than the circumference of the chest.

These are to be applied as follows: Begin by fixing the end of one strap upon the inside of the arm of the injured side, opposite the insertion of the deltoid. Carry the strap across the belly of the biceps and around the back of the arm, bringing the arm well back (Fig. 33). Continue the strap horizontally across the back and around under the nipples (Fig. 33). In fixing the end to the arm, care must be taken not to begin too far back, lest the arm be girdled and the circulation be arrested.

This first bandage is the peculiar characteristic of the dressing, as it serves as a fulcrum by which the leverage of the other bandage is brought to bear.

Into the axilla a pad of proper size should then be placed, and the elbow pressed to the side, which carries the shoulder well *outward*. The hand should then be carried upon the sound shoulder as high as, or even higher than, is shown in

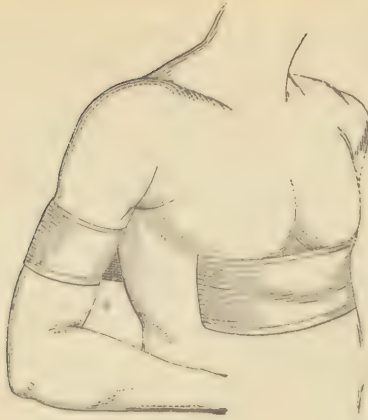


FIG. 33



FIG. 34.

Fig. 34, and the elbow supported at the desired point, while the second strap is applied as follows:

Begin in front of the sound shoulder and carry the strap over the shoulder, diagonally down and across the back, so that its upper edge shall cross the injured arm about at the junction of the middle and lower thirds. The plaster is then moulded to the back of the arm and elbow, and dorsal and

ulnar surfaces of the forearm, and finally drawn firmly over the back of the hand and overlaps the other end of the plaster on the top of the shoulder. It is well to fasten the ends together by a pin, which prevents the possibility of slipping. At the elbow the plaster should be made to fit accurately by cutting nicks in the edge and overlapping them.

The three indications—upward, outward, and backward—are then thus answered:

1. Upward, by the direct lifting of the shoulder upon its fellow as a point of support.

2, and 3. Outward and backward, by carrying the elbow inward and forward, while the middle of the humerus is fixed as a fulcrum by the first bandage; the axillary pad assisting somewhat the leverage.

If the fragments show a tendency to tip forward, I place over them a pad which is held in position by an adhesive strap passing from the back of the shoulder over the point of fracture and around the forearm, like a sling. The weight of the arm makes sufficient pressure upon the displaced fragments to keep them in position.

An additional strap over the arm and body, to prevent motion, may occasionally be necessary.

The peculiarities of this mode of dressing will at once be recognized, namely, that the bandages, being adhesive, remain as originally adjusted; and the furnishing of a firm fulcrum gives a means of reducing the displacement which cannot be attained by other modes of dressing.

The firmness of the apparatus is shown by the fact that, after it is applied, the patient, as you see, can endure a pretty rough shaking of the injured shoulder without complaint and without displacement.

I have had patients return to their labor immediately after being dressed, and I particularly recall the case of one—a blacksmith—who, I think, lost not more than one hour's work on account of his accident, simply the time occupied in coming to my office and returning to his shop; as you see in this case, it takes but a few minutes to apply the dressing.

If the plaster is well made and spread upon good material,

one dressing will prove sufficient. If not, you must supply new ones as occasion requires.

In young children, you will find this dressing of the greatest advantage, and the only one that I have seen used with equally satisfactory results.

A fractured clavicle, dressed in this manner as soon as received, allows the man of business to immediately pursue his labor, and the child to at once engage in his frolic and sport. Care must of course be taken not to apply your dressings so tightly as to interrupt the circulation, but a little tact and close observation will soon give you the necessary experience for an accurate adjustment.

VI.—THE MITRAL DIRECT AND THE TRICUSPID DIRECT CARDIAC MURMUR.

On the Diagnostic Characters, Mechanism, and Pathological Significance of the Mitral Direct or Obstructive Cardiac Murmur, and on the Occurrence of a Tricuspid Direct Murmur. By AUSTIN FLINT, M. D., one of the Attending Physicians to Bellevue Hospital, etc., etc.

THE existence of a mitral direct or obstructive cardiac murmur, that is, a murmur produced by the current of blood in its direct course from the left auricle into the left ventricle, is denied by some and doubted by others. The validity of a murmur thus produced rests, of course, on clinical cases in which a murmur, having the diagnostic characters of the mitral direct murmur, was observed during life, and mitral lesions are found after death. The proof is complete in such cases if the murmur was observed to occur prior to the ventricular systole; for, assuming the murmur to come from the mitral orifice, how is it possible for it to be produced otherwise than by a current from the auricle to the ventricle, provided it be not caused by contraction of the left ventricle? Now, the relation of this murmur, as regards the time of its occurrence, to the first sound of the heart, is such that it cannot be caused by the contraction of the left ventricle. It will not be denied that the first sound of the heart represents the occurrence of the ventricular systole; this sound is caused by the ventricular systole, and there cannot be any appreciable lapse of time after the contraction of the ventricles and the first sound. The mitral direct murmur precedes the first sound of the heart. It ends with this sound. It is produced,

therefore, prior to the ventricular systole; and, occurring in this pre-systolic relation, there is no current of blood to produce it except the direct mitral current; that is, the current from the auricle to the ventricle. Observation of the living heart, exposed in inferior animals, shows that the auricles contract at the time this murmur occurs; they contract just before the ventricular systole, and their contraction continues up to the time when the latter occurs.

It will aid in appreciating the most distinctive diagnostic feature of the murmur under consideration, to place distinctly before the mind's eye the succession of movements which takes place during the revolutions or successive beats of the heart. Taking the auricles as the point of departure, these contract; next comes the contraction of the ventricles, causing the first sound, the apex impulse, and the arterial pulse; lastly, the recoil of the arterial coats causes the second sound. The contraction of the auricles, which produces the mitral direct current of blood, thus occurs after the second and before the first sound; that is, during the pause between the second sound and the succeeding first sound. The auricular contraction, however, is in closer relation to the first than to the second sound; it is pre-systolic rather than post-diastolic. The mitral direct current is going on when the contraction of the ventricles takes place, and this current must be instantly and completely arrested when the ventricular systole takes place.

With a clear apprehension of the order of succession of the three successive movements which are concerned in the production of the heart-sounds and the heart-murmurs—namely, 1. The auricular contraction; 2. The ventricular contraction; and, 3. The arterial recoil—the most distinctive of the diagnostic characters of the mitral direct murmur cannot fail to be appreciated. The murmur begins after the second, and ends with the first sound of the heart; this is expressed by the term pre-systolic murmur. The murmur continues until the first sound occurs. It increases in intensity until it ends in the first sound, and it seems to be, as it were, suddenly cut short when the first sound is heard.¹ It does not, as of course it cannot,

¹ I do not think an instance has ever fallen under my observation in which this murmur ended before the first sound. Niemeyer, however,

continue an instant after the first sound. In discriminating this murmur from other endocardial murmurs, it is only necessary to determine its pre-systolic character, for no other murmur from the left side of the heart occurs in the same relation to the first sound. If its pre-systolic character be understood and ascertained, the murmur cannot be confounded with a mitral regurgitant murmur, for the latter begins precisely when the mitral direct murmur ends. It cannot be confounded with an aortic regurgitant murmur, for the latter begins with the second sound, its intensity gradually diminishes, and it generally ends before the succeeding first sound. The young auscultator, who may not always readily distinguish the first sound of the heart, will sometimes find it convenient to place the finger over the carotid artery, and determine in this way that the murmur is arrested when the first sound occurs, the carotid pulse being synchronous with this sound. The apex-beat of the heart, if this can be felt, will answer the same end.

The quality of the mitral murmur is another diagnostic character. The quality of sound is peculiar and quite uniform. I have incorrectly said, in my work on the "Diseases of the Heart," that this murmur is soft; the quality is more properly called rough. The sound may be imitated by throwing the lips into vibration with the expired breath, and hence I have been accustomed to use the word *blubbery* to express the quality. This peculiar quality is quite characteristic; the reason for this quality will appear presently in connection with the mechanism of the production of the murmur.

The murmur is often quite intense. Its intensity in certain cases has been cited as evidence that it is not produced by the auricular contraction, the force of this contraction being supposed to be insufficient to produce so loud a murmur. When its mechanism is explained, however, the intensity will be found to be sufficiently intelligible. Finally, this murmur, however intense, is not diffused over a large space. It is generally heard within a circumscribed area around the situation of the apex-beat of the heart.

quotes a statement by Traube, that, if the action of the heart be much retarded by digitalis, the murmur ends before the first sound; that is, there is an appreciable interval between the murmur and this sound.

In my clinical experience at the Bellevue and the Charity Hospital during the past seven years, together with private practice, I have met with a large number of examples of this murmur. I have notes of a considerable number of cases in which the connection of the sign with mitral lesions was established by autopsical examinations. The lesion which especially gives rise to this murmur is the union of the mitral curtains so as to cause the button-hole contraction, the curtains remaining flexible. In this form of obstruction, the mitral curtains, on their auricular aspect, present a funnel-shaped space, the communication with the ventricle being through a slit which is more or less narrow. Under these circumstances, the current of blood, forced through the aperture by the contraction of the auricle, throws the flexible curtains into vibration, as the lips or the tongue may be made to vibrate by the current of expired air. Hence, the blubbering quality of the murmur. This being the mechanism, it is easy to understand that the murmur may be quite intense, although the force of the mitral direct current of blood be not great. Let any one throw the lips into vibration with a feeble expired breath, and it will be at once seen how little force is requisite to produce a loud blubbering sound. The intensity of the murmur, therefore, is no obstacle in the way of its being attributable to contraction of the auricle.

This murmur is not so infrequently met with as I formerly supposed. Among from fifteen to twenty hundred patients in the Bellevue and the Charity Hospital, several examples may always be found. It is, however, quite rare in comparison with the mitral regurgitant murmur, and is by no means as frequently met with as the aortic direct and the aortic regurgitant murmur. In my work on the "Diseases of the Heart," I have stated that this murmur is "usually accompanied by a systolic mitral regurgitant murmur, the same lesions giving rise to both." When this statement was made, my practical acquaintance with this sign was much less than now. The statement is by far too strong; the occurrence of the mitral direct without a mitral regurgitant murmur is the rule rather than the exception. This is intelligible when the lesion most favorable for the production of the mitral direct murmur is con-

sidered. The button-hole obstructive lesion, in many cases, exists without insufficiency of the mitral valve; and this is especially apt to be the case when the mitral curtains are flexible, and thereby capable of vibrating so as to produce a loud mitral direct murmur. The association of a mitral direct with a mitral regurgitant murmur renders the differential characters of the former extremely clear and simple. The mitral direct murmur, with its peculiar vibratory quality, begins after the second sound, and, progressively increasing in intensity, ends abruptly and completely with the first sound of the heart, or with the carotid pulse, or with the apex-beat; then, with the first sound, or the carotid pulse, or the apex-beat, begins the mitral regurgitant murmur, which is oftener soft than rough, differing thus notably in quality from the mitral direct murmur. The first sound of the heart, or the carotid pulse, or the apex-beat, is thus between the two murmurs, forming the ending of one and the beginning of the other.

The mitral direct murmur may be produced when no mitral lesion exists. So far as the mitral valve is concerned, the murmur may thus be purely functional or inorganic. Not only does the murmur occur without mitral lesion, but it may be intense, and have the peculiar vibratory or blubbery character in a marked degree. I have notes of two cases in which this murmur was observed, its characters unmistakably present, its intensity considerable, and, on *post-mortem* examination, the mitral orifice was free from any lesion; but in both these cases there was aortic regurgitation, as shown by an aortic regurgitant murmur, and by lesions found after death. In one of the cases sudden death was caused by paralysis of the heart, resulting from accumulation of blood in the left ventricle, in consequence of the aortic regurgitation.

An adequate explanation may be given of the occurrence, in some cases of aortic insufficiency, of a mitral direct murmur without mitral lesion. Assuming that free aortic regurgitation takes place, the quantity of blood returned into the left ventricle immediately after the systole may be sufficient to float and bring together the mitral curtains, an effect of filling this ventricle with liquid, as shown by the physiological experiment of injecting liquid into it from the left auricle. At the time

of the auricular contraction, then, the ventricular cavity already containing considerable blood, and the mitral curtains being in apposition, the mitral direct current throws the latter into vibration as the lips are made to vibrate with the expired breath, and the murmur is produced. Whether this be the correct explanation or not, it being a clinical fact that a mitral direct murmur may be produced without mitral lesion, if there be aortic insufficiency, the practical maxim is, that this murmur, when associated with an aortic regurgitant murmur, does not warrant a positive diagnosis of a mitral obstructive lesion. It is probable that the murmur, when produced without mitral lesion, is liable to occur intermittently, and to fluctuate at different times as regards intensity. I have observed intermittency and fluctuations in some cases in which I was thereby led to suspect that mitral lesion did not exist, but in which the opportunity was not offered of verifying the correctness of this suspicion by autopsical examinations.

Is a tricuspid direct or obstructive murmur ever produced? I am not aware that the affirmative answer to this question has been established. An obstructive lesion of the kind which is of frequent occurrence at the mitral orifice, and which is favorable to the production of a direct murmur, namely, adherence of the curtains, so as to leave a button-hole-like aperture, the curtains remaining flexible and readily vibrating, is exceedingly rare at the tricuspid orifice. More especially, instances in which such a lesion, existing at the tricuspid orifice, is unaccompanied by a mitral lesion, must be rare; I do not recall a single example in my own experience. An example, however, of the button-hole contraction existing both at the mitral and tricuspid orifice has come under my observation, and there is reason to believe that in this case there was both a mitral and a tricuspid direct murmur. The patient was examined by me at a clinic in the summer of 1866. There was an unusually intense pre-systolic murmur, but I did not suspect any other source of the murmur than the mitral orifice. The murmur was so loud that the case served to illustrate it to numerous students. Subsequently the patient was under the care of Dr. George K. Smith, demonstrator of anatomy in

the Long Island College Hospital. Dr. Smith observed, not only that the murmur was notably intense, but that it was heard at the apex of the heart, at the ensiform cartilage, and that it extended to the right of the latter. The patient died in May, 1867, and, on examination after death, the following lesions were found: The mitral curtains adhered together at their sides, leaving an opening which admitted only the end of the little finger, the curtains being flexible; the tricuspid curtains were in like manner adherent, leaving an opening which admitted only one finger, these curtains also being flexible; the aortic valves were thickened, and their edges studded with small vegetations; both auricles were much dilated, the right auricle more than the left; the ventricles were moderately dilated and hypertrophied, the dilatation predominating.

The probable existence of a tricuspid, as well as a mitral direct, murmur in this case, is predicated on the unusual intensity of the pre-systolic murmur, and on the fact of its being heard considerably to the right of the area within which it is usually confined.¹

¹ The short duration of the auricular systole has been considered as rendering impossible either a tricuspid or a mitral direct murmur. It is claimed that the murmur, so-called, is sometimes longer than the period occupied by the active contraction of the auricles. Admitting this to be true, the current of blood from the auricle to the ventricle requires so little force for the production of the murmur in the manner described in this article, that the current, taking place before the auricle contracts, may be supposed to throw the curtains into vibration sufficiently for a murmur to be produced. It is consistent with this supposition that the mitral direct murmur is apt to be feeble at its beginning, its loudness increasing progressively up to its sudden ending. The elasticity of the walls of the auricles, and their situation above the ventricles occasion a current with a certain amount of force directly after the ventricular systole, and before the auricular systole.

VII.—ON THE VENOUS HUM.

On the Mode of obtaining the Venous Hum, and the Value of this Physical Sign. By AUSTIN FLINT, M. D., one of the Attending Physicians to Bellevue Hospital, etc., etc.

THE continuous murmur, frequently musical, obtained by placing the stethoscope over the veins of the neck, is now commonly known by the name venous hum. The French term *bruit de diable*, introduced by Bouillaud, expresses very well the character of the sound, with the understanding that the portentous word *diable* means here a very innocent toy, namely, the humming or spinning-top. Practical auscultators have for several years past recognized the significance of this sign as denoting impoverishment of the blood, and, when found in connection with an aortic direct murmur, as favoring the conclusion that the latter is inorganic or anæmic. Heretofore, in my experience, the value of this sign has been much restricted by its frequent absence in cases of anæmia, and by the irregularity of its presence in the same case, that is, it being now present and now absent even when successive examinations were made after short intervals. In seeking for examples among hospital patients, in order to illustrate the sign to private classes, I have often found it necessary to examine a large number, some of whom presented the unmistakable facies of anæmia; and, when I had found the sign well marked, not infrequently it had apparently disappeared when the cases were brought before the class, or sometimes it was readily discovered by a portion of the class and not by the remainder. In short, its unreliability was such that I was not accustomed to attach any value to its absence, as excluding anæmia. But for the past three years my experience has been quite different. I now find the sign almost invariably in cases of well-marked anæmia; it is often present

when the face does not show impoverishment of the blood, and I do not fail in finding it on each successive examination. Hence, I have come to depend upon the sign as a constant and reliable criterion of the existence of anæmia.

This difference, as regards my experience, between the past and the present time, has arisen from a simple change in the position of the head of the patient while the stethoscope is applied to the neck. The patient being either sitting or standing, the head is turned as far as possible to the left, and the stethoscope is then placed within the triangular space posterior to the sterno-cleido-mastoid muscle, on the right side. The stethoscope is shifted from point to point within this triangular space, and with varying degrees of pressure, until either the murmur is heard, or its absence is ascertained. I should add that Cammann's binaural stethoscope is the only one which I employ in auscultation, and that I have had no experience for the past ten years with any other; I am not able, therefore, to say whether the same success is to be obtained with the wooden cylinder.

I was led accidentally to discover the effect of the position of the head just stated; and for a time, finding the murmur so frequently, I suspected that its presence might be due exclusively to this position, the sign, therefore, under these circumstances, not representing faithfully impoverishment of the blood. But having now for about three years been in the habit of examining daily patients in hospital and private practice with a view to determine the value of the sign, I am satisfied that the frequency of the sign is owing to the large number of the cases into which the anæmic condition enters as a more or less important element. This conclusion is based on, *first*, the constancy of the sign in cases of well-marked anæmia produced by hæmorrhages, lactation, etc., the anæmic condition being shown by pallor of the prolabia and face; *second*, the association of the sign with ailments pathologically consistent with anæmia, in cases in which the anæmic complexion is not marked nor even apparent; *third*, the disappearance of the sign, conjoined with improvement or recovery, as otherwise manifested, under measures of treatment addressed to anæmia; and, *lastly*, on the absence of the sign

when the symptoms are not consistent with the supposition that the patient is anæmic.

Before I had learned the value of the venous hum, I had been led not to rely upon the absence of pallor of the prolabia and face as conclusive evidence against the existence of anæmia. This is a point which I have for many years endeavored to impress in clinical teaching. Anæmic patients sometimes have even a rosy complexion. I was accustomed to say that the physician must trust much to the history and symptoms, without regard to the facies, in determining that anæmia exists; but, with my present knowledge of the manner in which the venous hum is to be obtained, I am satisfied to depend on its presence as proof of the existence of anæmia, not only when the countenance fails to show this condition, but when the history and symptoms would not warrant a positive opinion.

It is well known that anæmia, when incident to certain chronic diseases, namely, tuberculous and carcinomatous affections, degenerative diseases of the kidneys, chronic dysentery, etc., does not, as a rule, involve the physical conditions requisite for the venous hum. So far as my present experience goes, I have found this rule to hold true when auscultation is practised in the manner above described. It is in cases in which the anæmia may be distinguished as functional, that is, anæmia not dependent on some serious chronic disease, that this sign, when sought for in the manner described, is to be depended upon; and obviously the practical value of the sign is limited to these cases. In the treatment of cases of functional anæmia the practitioner will find auscultation of the neck extremely useful by enabling him to determine, by the persistence of the sign, that the anæmic condition continues, and, by the disappearance of the sign, that the blood is no longer impoverished. I would add, in conclusion, that the intensity of the murmur is not proportionate to the degree of the anæmia as evidenced by its pathological effects; a loud hum is frequently found in cases in which the appearance and the ailments do not denote a highly anæmic condition, and, on the other hand, the hum is often feeble when it is evident that the blood is much impoverished.



VIII.—ABDOMINAL HERNIA.

Cases illustrating Strangulated Abdominal Hernia, with other Abdominal Hernia, not Strangulated, of Unusual Character, etc., etc., in all, seventy-three Examples; accompanied with Practical Remarks. By FRANK HASTINGS HAMILTON, M. D., one of the Visiting Surgeons to Bellevue and to Charity Hospital, Professor of the Practice of Surgery, with Operations and Clinical Surgery, in the Bellevue Hospital Medical College.

CHAPTER I.—INDIRECT INGUINAL HERNIA.

Sec. I.—Congenital (into the vaginal process of the peritonæum).

A.—STRANGULATED; REDUCED BY SURGICAL OPERATION.

CASE I.—*Indirect inguinal hernia; congenital; funicular; concealed; testicle not descended; abnormal formation of inguinal canal and rings; strangulated four days; repeated attempts to reduce by taxis; operation under ether; stricture at internal ring; recovery.*

A German lad, aged eighteen, was admitted to ward 13, December 16, 1867. The history of his case up to this time was as follows: Neither of his testes has ever descended. Has always, since he was three years old, had an oblong swelling over the course of the right inguinal canal. Never diminished or increased in size. (This circumstance seems to have been explained, in part at least, during the operation, by the presence of the right testis in the inguinal canal.)

December 13.—Without any apparent cause the swelling became a little larger. He felt pain and began to vomit.

December 16.—Dr. H. G. Piffard was called. Patient had already taken three drops of croton-oil and other physic. No

movement of bowels for three days; vomiting. Dr. Piffard discovered the oblong swelling, but could not lessen it by taxis. Sent him to Bellevue.

Dr. Sayre saw him in the evening of the same day. He also applied taxis until the swelling seemed to be lessened.

On the following day, December 17, the patient being in my service, he was examined by Dr. Wood and by myself. No hernia could be detected; but the symptoms of strangulation still continued. He was vomiting bile. His bowels had not moved, except as they had been moved by an enema. He was exceedingly prostrated, and the chance of his recovery, even with an operation, seemed small.

Examining the seat of the oblong swelling more particularly, it was found to correspond to what is the usual course and length of the inguinal canal. It was soft, and apparently contained neither intestine nor omentum. It was further ascertained that the external abdominal ring was two and a half inches in its longest diameter, and that the oblong swelling corresponded in fact only to the diameter of the ring.

There was no pain in the region of the supposed hernia, nor tenderness. Both of these symptoms were referred only to the upper half of the belly.

On the same day ether was administered, and I operated in the presence of the class.

An incision was made over the oblong swelling in a direction corresponding to the usual position of the inguinal canal, and of about the same length. The *arteria ad cutem abdominis* was divided and tied, and a peritoneal sac or pouch was opened. This was found to extend down into the scrotum; it was very thin, and contained about one ounce of nearly transparent fluid, without odor. The testis was found lying behind this pouch, in about the middle of the track of the wound.

Carrying the finger up, I found the pouch expanding in that direction, on all sides. At first no stricture could be detected; and, as the upper end of the incision appeared to correspond to the usual point of the internal ring, it seemed as if the finger must have passed through the internal ring into the cavity of the belly.

Pushing the finger up still farther, however, it was finally

arrested by a septum, through which the point of the finger entered a small circular opening, having sharp and firm edges. This opening seemed to be of the size of a five-cent piece, and in it lay what felt like a knuckle of intestine.

In order to determine the exact position of this opening, I passed the end of my finger outward toward the wall of the belly, and found that it was nearly in the middle of a line drawn from the antero-superior spinous process of the ilium to the umbilicus; or, to be more accurate, about one inch nearer the umbilicus than the middle, and three-quarters of an inch below this line.

The finger remaining in this ring, I carried up a long, narrow, blunt-pointed bistoury, and with much difficulty entered it sufficiently to cut it upward and outward. Now passing the last joint of the finger entirely through, the margins of the ring were still felt to be very sharp and firm, and having hooked my finger over the margin I drew it down with considerable effort, to the upper angle of the external wound, where it was seen and cut more freely. The intestine was never seen.

It is probable that the intestine was adherent to the inner wall of the ring and sac, from which it was impossible to displace or to return it within the cavity of the belly.

After a digital examination had been made by Drs. Sands and Piffard, the wound was closed and the patient returned to the ward.

About four hours after the operation, the patient, unobserved by the orderly, arose from his bed and had a copious evacuation of his bowels. The following day all symptoms of strangulation were found to have disappeared. Indeed, they never returned after the operation. On the third day the orderly gave him, by mistake, the dose being intended for the patient in the next bed, a large portion of sulphate of magnesia, which operated several times, and, fortunately, did him no harm.

He was discharged, cured, January 10, 1868; since which time he has, at my request, called upon me repeatedly at my office. The hernia still passes down at the seat of the opera-

tion, and he is obliged to wear a truss ; but the strangulation has not recurred.

Remarks.—The non-descent of the testicle is a common event ; and it is known to predispose to the occurrence of hernia ; but the peculiar abnormal condition of the inguinal canal or of the tunica vaginalis propria funiculi, which existed in this case, has never before been noticed by me. The external ring covered the entire length of the space usually occupied by the inguinal canal ; while the internal ring occupied a position two or three inches farther outward and upward than usual, and the space between the outer margin of the external ring and the internal ring was remarkably broad, forming a capacious pouch, in which the hernia had probably been lodged for a long time before the strangulation occurred.

The term “congenital” is applied to this case because, the testicle remaining in the canal, and lying close behind the hernial sac, furnishes all the evidence that is required to establish this fact. It belonged to that variety of congenital hernia called by Mr. Birkett “funicular,” in which the lower portion of the peritoneal process has closed, but not the upper. It is probable also that an abortive attempt on the part of Nature to close the peritoneal process at the seat of the internal ring gave rise to the stricture and strangulation. It will be observed, moreover, that the protrusion occurred suddenly, as is generally the case in congenital hernia—not slowly and gradually, as happens most often in other forms of hernia.

CASE II.—*Indirect inguinal hernia ; congenital ; scrotal ; enterocoele ; strangulated seven hours ; repeated attempts to reduce by taxis ; operation under chloroform ; stricture at external ring ; division of stricture outside of the sac after opening the sac. Intestine thrust out, a few hours after the operation, by vomiting ; sloughing of scrotum ; complete recovery.*

Patrick Johnson, aged thirty-four, admitted to Bellevue Hospital March 15, 1865. He stated that when fifteen years old he began to experience some pain in the right inguinal region. At twenty the hernia descended suddenly, since which time it has often been down, but was easily reduced.

When admitted the hernia had been down five hours, and violent efforts had been made to reduce it. It was enormously large, very tense and tender. After several attempts to replace the intestine by taxis, I placed him under the influence of chloroform and operated—two hours after admission and seven hours after the strangulation occurred. I found only intestine with a large amount of serum; and both were contained in the cavity of the tunica vaginalis testis. There were no adhesions. Intestine congested, but its color was not very dark. The stricture was at the external ring; which I relieved by cutting the fibrous bands outside of the sac; after which the intestine was easily reduced. I closed the lower three-fourths of the wound with five or six small silk sutures, and laid him on his back in bed, with instructions to remain in this position. A few hours after, he was seized with a paroxysm of vomiting, occasioned by the chloroform, and the intestine was protruded violently through that portion of the wound which had not been closed by sutures; and the House Surgeon, not finding it possible to return it, was compelled to cut away the remaining sutures; after which it was easily returned, and was then maintained in place by a compress and bandage.

On the second day slight peritonitis appeared, but this was easily controlled by the moderate use of opium. About this time the scrotum began to slough, destroying ultimately quite three-fourths of the whole. While, however, the sloughing was going on, the pulse remained almost undisturbed, and the general condition of the system was good.

April 19, 1865, a little more than one month after the operation, the wound was nearly closed, and not long after he was discharged cured.

Remarks.—In this example the peritoneal process had remained open through its entire length, so that the hernia, instead of being arrested at the external ring, by a normal contraction and obliteration of the process from this point downward, had been permitted to descend to the bottom of the process, i. e., fairly into the tunica vaginalis propria testis. From which circumstance it derives its name as the “vaginal” or “scrotal” form of the congenital oblique hernia. There had

existed for many years, however, a narrowing of the peritoneal process opposite the external ring, sufficient to prevent the descent of the hernia; at the same point at which in Case I. there was a complete occlusion. This obstruction was suddenly overcome when twenty years old.

When admitted to the hospital the strangulation had existed only five hours, but the surgeons had employed great force in their attempts to reduce it; the consequence of which was that the coverings of the sac were greatly inflamed and swollen, and to this circumstance no doubt must be attributed the sloughing of the integuments which took place subsequent to the operation. The sac itself was, in consequence of this violence, inflamed also, and filled with serum, and the intestine was more congested than it is usually found to be after a strangulation of seven hours.

The subsequent protrusion of the hernia, from vomiting, suggests the propriety of closing the entire length of the wound, but especially the upper portion, with sutures, adhesive straps, a compress and bandage. Why these precautions were omitted in this case, I do not remember. It is my general practice to close these wounds in this manner, leaving only a small opening for the escape of blood at the lower angle. As additional precautions I frequently elevate the hips a little with a folded blanket, and forbid the patient to rise or even turn over in bed. When anaesthetics have been used, the danger of vomiting is so much greater, that these precautions cannot safely be omitted.

Strangulated congenital hernia, especially when it occurs late in life, is in general more difficult to reduce by taxis than other hernia, because of the more unyielding nature of the stricture; and, when its character is clearly made out by the surgeon, he will do well not to prolong his attempts at reduction by taxis very much.

The stricture was relieved, after opening the sac, by cutting on the outer side. It may be, therefore, that this was one of those more rare examples of old hernia, in which the stricture was due, not to the contraction of the peritoneal process or canal at this point, but to the formation of fibrous

bands outside which encroached upon and thus strictured the peritoneal canal.

CASE III.—*Indirect inguinal hernia ; congenital ; enterocele ; strangulated thirty-one hours ; taxis prolonged ; operation under chloroform and ether ; principal stricture at internal ring, divided by tearing ; smaller stricture at external ring, divided with the knife ; recovery.*

October 31, 1865.—I was called in consultation by Dr. S. D. Wadsworth, to see George Post, aged twenty-eight, at 388 Fourth Avenue, N. Y. He had a congenital, strangulated, indirect inguinal hernia of the right side. The hernia had existed since birth. Had been strangulated several times before. Patient had never worn a truss. The strangulation had now existed about twenty-eight hours. Taxis had been employed faithfully, but gently, under the influence of full doses of morphine and of chloroform. He had nausea and vomiting, and the bowels were very tender.

An attempt was made to reduce the hernia by taxis conjoined with posture—placing the feet of the bedstead upon a table. This was continued three hours, but with no effect.

I operated, the patient being under the influence of chloroform and ether. The sac was now ascertained to be the tunica vaginalis. Nothing but intestine in the sac ; no adhesions. Sac filled with straw-colored, inodorous serum. Intestine of a dark-brown color. Stricture at internal ring ; and the sac had a second narrowing or slight stricture at a point near the external ring. I tore the stricture at the internal ring with my finger, after cutting the lower stricture. The hernia was easily reduced. The wound was closed with sutures and a compress, and the hips were then elevated by pillows to diminish the chance of descent of the intestine. No vomiting followed the operation. No physic was administered. He took opium moderately, and in three weeks the wound was healed.

Remarks.—Dr. Wadsworth, under whose excellent management he remained after the operation, and to whom the patient is especially indebted for his complete recovery, informs me that the hernia is permanently cured. He does

not wear a truss, but labors daily in a store where he is required to do much heavy lifting, without inconvenience.

The occurrence of the stricture in the peritoneal process, at or near the external ring, the same as in Case II., and at the same point at which the hernia was arrested in Case I., is worthy of notice; since it illustrates what has been often observed in the autopsy of persons whose peritoneal process has never closed—namely, a narrowing of this canal not only just above the testicle, and at the fascia transversalis, or internal ring, but also at some point near its middle. The stricture might therefore occur at either of these three points, and in either case it would probably be due to a contraction of the peritoneal canal alone. In two of the three cases now recorded, the stricture was at or near the external abdominal ring.

CASE IV.—*Indirect inguinal hernia; congenital; temporary strangulation; inflammation and suppuration of the hernial sac; operation under chloroform; recovery from the operation, and death after six months.*

January 13, 1852.—I was consulted by G. P., of Attica, N. Y., aged eighteen, in reference to a swelling in his left inguinal region and scrotum. He stated that his left testis did not descend until he was nine years old, since which time he had noticed something, which he knew now to have been the testis, occasionally descending into the scrotum, and again disappearing. Eight days before consulting me he was seized with a severe pain in this part, accompanied with much swelling and tenderness, and this was soon followed by nausea and vomiting. Four days later his surgeon, Dr. Royce, discovered what he supposed to be a hernia, which he reduced by taxis, as he believed; but the hernia was said to have immediately returned into the scrotum.

When seen by myself, it was impossible to recognize the existence of a hernia. His bowels had moved several times freely during the last few days; the vomiting had ceased; the cavity of the tunica vaginalis seemed filled with fluid, and it was tender on pressure.

January 15th, ten days after the accession of the acute symptoms, the swelling and tenderness had increased, but

there were yet no symptoms of strangulation. Believing that it was inflammation, with suppuration of the tunica vaginalis testis, it was decided to operate. Having placed him under the influence of chloroform, assisted by Drs. Royce and Cotes, I laid open the sac freely, and gave exit to a large amount of fetid pus. The sac contained no hernia; but its internal surface was roughened and covered with granulations. A probe could be made to pass upward as far as the internal ring, but it did not seem to enter the cavity of the abdomen.

The wound was dressed with a poultice, and the patient was left in charge of Dr. Royce.

I have since learned that this patient survived the operation about six months, but that the wound never entirely closed. Whether he died directly and solely from this cause, or from some other malady, I have never been able to learn.

Remarks.—I can have no doubt that a hernia existed—that some days prior to my visit it became strangulated, and was reduced. The subsidence of the vomiting at this period confirms this view; but the sac of the tunica vaginalis testis was already filled with serum and perhaps pus, and led the surgeon to suppose that the hernia was not retained in the belly. The subsequent symptoms were only those of an inflamed hydrocele, or inflamed hernial sac. The offensive odor connected with the pus did not indicate any lesion of an intestine. It is present in many cases of strangulated intestinal hernia where there is no lesion, and is not at all uncommon in abscesses which have no connection with intestine or the external air.

The closure of the canal communicating with the cavity of the belly was not rendered absolutely certain; but, if it was actually closed, no doubt this was a result of the inflammatory process continuing after the reduction of the hernia.

B.—STRANGULATED; REDUCED WITHOUT AN OPERATION.

CASE V.—*Indirect inguinal hernia; congenital; infant; strangulated several hours; ineffectual taxis; reduced by the application of ice.*

Infant son of Jonathan Fuller, Auburn, N.Y., August, 1835, had a congenital hernia, which had become strangulated the

day before. Patient much prostrated and vomiting. After a prolonged and unsuccessful taxis, I applied a beef's bladder containing pounded ice with water, interposing a folded napkin between the skin and the bladder. During the application of the ice, the hips of the child were kept constantly elevated, but no taxis was employed. After about four hours the hernia suddenly retired, and the recovery was complete.

Remarks.—In this case the seat of stricture seemed to be at or near the external abdominal ring. It certainly was not in the lower part of the funicular canal, since the hernia expanded freely from this point downward to near the bottom of the scrotum. Taxis failed, as it does more often in congenital than in other hernia; and the hernia was finally reduced by rest, cold, and position.

Precisely how these causes operated in the reduction, it might be difficult to say. It is probable, however, that rest, with the cessation of crying and straining, favored the reduction simply by removing the most active causes of the extrusion, and not at all by removing the sources of strangulation. Anæsthetics operate in the same manner, but more efficiently, since they put at rest completely the action of the abdominal muscles. They are, however, of less value in congenital and in all cases of old hernia, for the reason that the stricture in these examples depends more upon a narrowing of the peritoneal canal than upon the condition of the muscular and fibrous tissues outside of the peritonæum. The cold applications probably diminished the congestion of the vessels in the narrow or constricting portion of the funicular canal. It is probable, also, that the cold diminished the congestion and swelling of the hernial protrusion itself; that is to say, of the coats of the intestine, and thus facilitated its return. Finally, the air, with the other contents of the hernia, was probably in some degree condensed by the cold. In one or all of these conditions we must seek for an explanation of the influence of cold in facilitating the reduction of this and of other herniæ.

CASE VI.—*Indirect inguinal hernia; congenital; strangulated; spontaneous reduction after failure of taxis; recovery.*

Charles Cobb, aged three years. The mother discovered the hernia about six months before consulting a surgeon. The surgeon who examined it pronounced it a hydrocele. September 10, 1857, she consulted me on account of the occurrence of pain and other unusual symptoms. I found a strangulated, indirect inguinal hernia on the right side, which occupied the peritoneal process and the tunica vaginalis testis. The mother said it had never been so large as it was at this time, and that frequently it disappeared entirely. She was now unable to reduce it. I made taxis for some time ineffectually, and, as the symptoms of strangulation were not urgent, I left the child for the night, with the intention of employing anaesthetics in the morning; but, when I returned on the following day, I learned that the hernia had disappeared spontaneously during the night.

Remarks.—With infants, the difficulty of reducing a hernia is always greatly increased by the crying and straining of the child. Rest during sleep, in the recumbent posture, which posture encourages the return, by emptying the intestine of its contents, and by dragging the viscera upward, may alone accomplish more than taxis applied while the little patient is awake. We shall refer to the subject of posture again.

CASE VII.—*Indirect inguinal hernia; congenital; strangulated twelve hours; reduction easily accomplished by taxis, aided by posture.*

March 10, 1854.—Samuel Tollhurst, aged two years. Hernia strangulated twelve hours; nausea and vomiting. I reduced this hernia in a few seconds, by simple taxis, while the mother held the legs and body on a pillow, considerably higher than the head. No surgeon had been called previously, but the mother had tried for some time to reduce it by pressure alone.

Remarks.—This case is introduced only as another illustration of the value of posture in conjunction with taxis; and in this connection I shall take the liberty of reporting another

case, not my own, in which a congenital hernia was reduced by the same method. The facts have been given to me in a brief note from my colleague, Dr. George T. Elliot, Jr.

CASE VIII.—*Indirect inguinal hernia ; congenital ; strangulated when thirteen days old ; reduction under chloroform, by posture, after taxis had failed, by Dr. George T. Elliot, Jr.*

"In 1852 or 1853, when I was resident physician of the Lying-in-Asylum of this city, there was in the house a male infant with oblique inguinal hernia. When the child was thirteen days old, I could not reduce this hernia as I had done on previous occasions. The late Dr. John C. Cheesman then saw the case in consultation, and failed with the taxis. With the doctor's consent I administered chloroform, and as soon as anaesthesia was produced, and the child held up by its legs, the hernia was reduced with the greatest facility. I subsequently cured the hernia with a truss."

CASE IX.—*Congenital hernia mistaken for a hydrocele ; ointments applied for the purpose of dispersing it.*

C. Y., of Rose, Wayne County, consulted me in 1847, in relation to a congenital hernia in the case of his infant son, fourteen months old. It was discovered the next day after his birth. It presented the usual appearance of a congenital hernia, which had descended into the scrotum, and was without difficulty reduced ; yet his physician had called it a hydrocele, and had been attempting to disperse it with ointments, which had at times occasioned considerable excoriation.

Remarks.—Several cases, in which the same errors have been committed by physicians and surgeons, have come under my notice. On the other hand, it has happened to me still more frequently to meet with examples of congenital hydrocele mistaken for hernia, and in some of which prolonged efforts at taxis have been made. The diagnosis is, in general, so easily made, that I do not think it necessary to detail these cases, or to enumerate the differential signs. A mistake of this kind implies great carelessness, or very little knowledge and experience in this department of surgery.

C.—CONGENITAL, INDIRECT INGUINAL HERNIA IN A FEMALE.

CASE X.—*Congenital, indirect inguinal hernia in a female; descending through the canal of Nuck and into the upper portion of the pouch of Broca; probably intestinal; reducible.*

April 25, 1855.—Dr. Boardman, of Buffalo, desired me to see, in consultation with himself, the infant daughter of Jacob Anderson, then four months old. Six weeks after birth, the parents first noticed a small swelling, situated over the external abdominal ring, and which had presented itself at intervals ever since. Crying occasionally forced it down, but it was more apt to descend when she was constipated, and strained to have a stool.

I found the tumor situated about one inch below the ring, in the labia; oval in form, and elastic; it seemed to contain intestine. Pressing upon it a few moments, while she was in the recumbent posture, it was made to retire through the ring into the cavity of the abdomen.

A truss was applied by Dr. Boardman, and its reduction was maintained.

D.—CONGENITAL AND NON-CONGENITAL INGUINAL AND FEMORAL HERNIÆ, CONTAINING THE OVARY, FALLOPIAN TUBE, ETC.

CASE XI.—*Congenital, inguinal hernia; ovarian; suppuration of the ovary.*

Minerva Ellis, living near Geneva, N. Y. When two weeks old, her sister, aged ten years, jumped upon her belly, accidentally, bruising her severely, and bending the ribs in upon one side and forcing the sternum forward, the injury being such that for several days she could not be moved without causing severe pain. Soon after, a small tumor was discovered over the right external abdominal ring, of the size and form of a large bean, which was movable. This tumor never disappeared, nor could it even be pushed into the belly. Sometimes, while playing violently, another and wholly distinct swelling, or tumor, would present itself on one side of the original and permanent tumor, and which often became as large as a hen's egg, was sometimes a little discolored—pur-

plish—but was never red. It was always tender, and very painful until it was returned. Its return was easily accomplished, however, either spontaneously, while lying on her back, or by moderate pressure, or by the addition of warm fomentations. Sometimes it would not disappear until she had lain one, two, or three hours. In a few instances it returned spontaneously while she was standing erect. Until menstruation commenced, this second tumor had presented itself as often as two or three times a week, except that during the third and fourth year of her life it did not appear at all.

She began to menstruate when thirteen years old; and from that time until I last saw her, in October, 1847, a period of eight years, her troubles and suffering had been increased. Her menstruation was always painful, scanty, and irregular, she having once passed five months without menstruation. But, whether the menstrual discharge occurred or not, the "period" was generally announced by some pain and tumefaction in the permanent or original small tumor. Often the pain was severe, and occasionally it was suddenly transferred to the loins, the hips, or even to the head. The pain and tumefaction would then regularly decline, and disappear in two or three days, even though menstruation had not occurred.

When fifteen years old she was suddenly seized with unusually severe pain in the tumor, which continued two or three days, and was relieved, after an abrupt and copious discharge of offensive matter through the vagina. I saw her not long after this last event, in consultation with Dr. Sumner Rhoades, a distinguished physician and surgeon, now residing at Ithaca, N. Y. She was exceedingly feeble, and was confined to her bed. She had a constant vaginal, leucorrhoeal discharge, and had occasional chills. The deformity of her ribs and sternum, caused by the original injury, was still manifest. The permanent tumor, which had for so many years varied but little in size, as I have already described, now, for the first time, became as large as a goose-egg, and was tender, red, and painful. The diagnosis was still doubtful; but, as it seemed to have suppurated, Dr. Rhoades opened it freely, and gave exit to a moderate quantity of pale-yellow serum, with perhaps a little pus. Introducing the probe, we now ascer-

tained that the tumor was composed of a cyst, the walls of which were thick and firm, and the interior of which was divided into large compartments or cells, constituting thus a multilocular cyst; we could find no point at which the cyst communicated with the cavity of the abdomen. This wound soon closed. Subsequently she was seen by Dr. Sprague, of Buffalo, and still later by Dr. Briggs, of Auburn. Dr. Briggs found a swelling, much like that which I had seen. He opened it freely, and discharged the same character of fluid matter as before, resembling serum.

October 9, 1847.—Five years after my first observation, the family having removed to Buffalo, I was consulted again. The tumor had now become much swollen for the third time. It was very tender and painful, and she was confined to her bed. In the main, however, her health had much improved since I first saw her. I opened the tumor, and gave exit to about two ounces of pale-yellow serum, but no pus. A tent was laid in the wound and a warm poultice applied.

From this period my knowledge of this interesting case ceases. I have omitted to mention, however, that I never saw the second or occasional tumor, it having ceased to protrude soon after menstruation began, at the time that the original tumor had increased a little in size, and had probably thus prevented its descent.

Remarks.—No doubt can exist, I apprehend, that this was an ovarian hernia, to which was added, during a period of her life, an intestinal hernia.

Examples of hernia of one or both of the ovaries through the inguinal canal of the female have occasionally been reported.

CASE XII.—In the first volume of Mr. Pott's surgical work, at p. 436, a case is related of a woman, twenty-three years of age, in whom both ovaries had thus escaped; and, as they could not be returned, and as they occasioned much inconvenience, they were both exposed by incision, ligatures were applied "close to the tendons, and they were cut off." The result was, that she became more muscular, she ceased to menstruate, and her breasts disappeared.

CASE XIII.—M. Guersant found a small tumor in the left labium of a girl, eleven years old, and which had existed since she was one year old. It was extremely movable, and could be pushed up as high as the external ring, and as far down as the fourchette. He thought it was a cyst, and cut it out, tying its pedicle in the same manner that Pott had done. Peritonitis ensued, and she died on the third day.¹

M. Lenoir, in listening to M. Guersant's report of this case, stated that Pott made the same mistake. Pott does not intimate that he removed the ovaries under a misapprehension of their nature, but one finds it difficult, upon any other supposition, to excuse his operation.

The following eight cases have been collected from the German literature by my friend Dr. C. C. Terry, and are published with the five cases reported or collated by myself, in order that the reference to these very rare accidents may be complete :

CASE XIV.—M. Deneux reports the case of a woman who had a swelling in the left groin, which was the seat of severe pain during the period of pregnancy. Three days after confinement, the swelling was of the size of a "large nut," rounded in the centre, uneven at the edges, irreducible and excessively painful. There was neither constipation nor vomiting. M. Deneux operated, supposing it was an ordinary hernia, but he found a portion of the ovary constricted in the ring, to which it had become adherent. On the ovary was a cyst as large as a hazel-nut, which, with the attached and constricted portion of the ovary, was contained in a hernial sac. Three-fourths of the cyst and nearly all of the ovary were cut away, and the remaining portion retracted within the abdomen in a few days. Her recovery was complete in twenty-nine days.²

CASE XV.—Neboux operated, on the third day after strangulation, upon an inguinal hernia in a female, and found it to contain an ovary of the size of a pigeon's egg. He cut

¹ Guersant. *Provincial Med. and Surg. Journ.*, 1851, p. 440; also *New York Med. Gaz.* (Reese), vol. ii., p. 252.

² Deneux. *Günther Blutige Operationen*, 4th Abth., Seite 133-'4.

the stricture and broke up the adhesions of the ovary to the sac, returning the ovary into the cavity of the pelvis. She was well in forty days.¹

CASE XVI.—Muler treports that a woman, forty-six years old, had noticed, four times during the previous year, a swelling in her left groin, which was very painful, compelling her to lie down on her back, with her thighs drawn up. The swelling and pain had each time gradually subsided. On the last occasion, however, it became more severe and caused vomiting. Mulert found an egg-shaped swelling over the external ring, which was hard, movable, and slightly sensitive. The pain extended from the ring to the umbilicus and stomach. Taxis proved ineffectual, and he proceeded to operate. There was no distinct hernial sac, but an ovary presented itself, attached to the adjacent tissues. It was of the size of a pigeon's egg, tense, and livid. Having separated the adhesions by his finger and a sound, he released the stricture by cutting Gimbernat's ligament in two places, and replaced the ovary deep in the pelvic cavity. The wound was healed in forty-eight days.

CASE XVII.—Mulert also states that he reduced by taxis another inguinal ovarian hernia, which was strangulated. (The diagnosis in each of the last two cases has been regarded as doubtful.²)

CASE XVIII.—A servant-girl was found by Krieger, having an elliptical, elastic, fluctuating, translucent swelling, resembling a hydrocele, of the size of a pig's bladder, occupying the right labium, and extending by a pedicle to the inguinal ring, which had existed as long as she could remember, and always of the same size. When seen by Krieger, she had been lifting a heavy weight, and the tumor was painful, and she was vomiting. He diagnosticated it as an irreducible hernia, with a collection of water. On the following day he operated. The sac contained half a pint of serum, a mass of fat, intestine, an ovary, and tube. After rupturing the stricture with his

¹ Neboux. Ibid.

² Ibid.

fingers, and after cutting away the fat and a portion of the sac, he was able to reduce the intestine, ovary, and tube, and to retain them in place. She recovered slowly.¹

CASE XIX.—Berard reports a case in which the Fallopian tube alone was in the hernial sac.

A woman, forty-five years of age, who had borne two children, had for two years a swelling in the right groin, which disappeared under pressure. Finally, it became as large as a pullet's egg. It was then irreducible, fluctuating, and seemed to extend into the abdominal canal. Believing it to be a serous cyst, it was opened by a trocar, and six or eight ounces of serum were discharged, and there was discovered a round body, about the size of a hazel-nut, occupying the ring. On the third day, the sac having closed and refilled, and the patient having pain in the abdomen, accompanied with vomiting, it was opened again more freely, and a milky serum was discharged; suppuration of the sac, and erysipelas ensued, and she died on the seventh day. The autopsy revealed the fact that the sac contained a portion of the Fallopian tube, which was hypertrophied and adherent to the sac. The interior of the sac communicated freely with the cavity of the abdomen. The right ovary was normal, but there existed a fibroid tumor in the substance of the uterus. There were also present the usual signs of fatal peritonitis.²

CASE XX.—Loeper relates that a woman, ten days after confinement, had a glandular swelling in the site of a former inguinal hernia. The tumor reached the size of a pigeon's egg. Loeper diagnosticated hernia of the right ovary, and operated, replacing the ovary, and a cure followed.³

CASE XXI.—Billard reports an example found in an infant, who died when seventeen days old. The tumor in the left inguinal region was about the size of a filbert, somewhat hard, and could not be reduced by taxis. On dissection, he found the ovary lodged at the bottom of the sac, and the cord

¹ Ibid. ² Ibid.

³ *Monatsschrift für Geburtskunde*, xxviii., 453.

occupying the canal of Nuck, which was much larger than natural. The uterus was tilted to the left side, and the kidney upon that side lay below the level of the opposite kidney.¹

The following case has been communicated to me by Dr. J. C. Nott, late of Mobile, and now of this city :

CASE XXII.—“About ten years ago, while residing in Mobile, I was requested by Dr. Henry S. Levert to see Mrs. W., with strangulated inguinal hernia. She was sixty years old, and had a large family of children. General health delicate. She had been troubled with the tumor about two years, and described it as a ball, which passed in and out of the abdominal ring. At the time I saw it the tumor had been out about twenty-four hours, and, through her flaccid skin, felt hard, round, and about the size of an English walnut. It was so hard and round that my first idea was of scirrhus, or other tumor connected with the omentum. She had a good deal of nausea, and pressure upon the tumor produced a very disagreeable sensation, accompanied by an inclination to vomit. Our efforts at reduction were unavailing, and we applied ice, gave opium, and determined to wait. In the afternoon no change had taken place, and it occurred to me, for the first time, that it might be the ovarium. With the view of aiding the diagnosis, I introduced two fingers of the right hand into the vagina, while the left was placed on the tumor. The fundus of the uterus was evidently dragged toward the hernial side; and when the fingers were placed upon the side of the neck of the uterus nearest the tumor, and pressed firmly, I could distinctly feel the lateral ligaments pull upon the tumor.

“It was forty-eight hours after I first saw her before the tumor was reduced, making about three days altogether of the protrusion, and she had each day thorough evacuations from her bowels.

“Opium, ice, and gentle taxis were the only means employed. I saw this lady occasionally for some years after this.

¹ Atlas d'Anatomie Pathologique pour Servir à l'Histoire des Maladies des Enfants; also, *Traité des Maladies des Enfants*. Troisième ed., p. 492, *et seq.* Same case, copied by Bouchut, *Maladies des Nouveaux nés*, 4th ed., 1862, p. 597.

The tumor occasionally protruded, but was kept up, by proper care, with a truss, and gave no more inconvenience than a small intestinal or omental hernia."

CASE XXIII.—Dr. Parker reports a case of femoral hernia occurring in an old woman, in which the sac was found to contain intestine, the ovary, and the fimbriated extremity of the Fallopian tube. The latter was attached to the walls of the sac, and he did not ascertain its true nature until he had dissected it away and cut it off. The ovary and intestine were then returned into the cavity of the abdomen, and the patient made a good recovery.¹

Mr. Birkett, in his excellent article on Hernia, in "Holmes's Surgery," vol. iv., p. 321, says that in one case the Fallopian tube and ovary have been found in an obturator hernia.

Frequent examples of vaginal ovarian hernia have also been reported; but, so far as I have been able to learn, they were all examples of simple falling or prolapse of diseased ovary, which pressed upon the vaginal walls, or perhaps had become adherent, without causing a real vaginal hernial protrusion. Braun reports five cases of ovarian hernia into the vagina, all impeding parturition; and which probably were of the character just described.²

Sec. II.—Indirect, Inguinal Hernia; not Congenital.

A.—STRANGULATED, AND REDUCED BY OPERATION.

FIRST.—ENTEROCELE.

CASE XXIV.—*Indirect inguinal hernia; not congenital; enterocele; strangulated twenty-four hours; operation under ether; stricture at the internal ring; division of stricture within the sac; recovery.*

Michael Klutz, of Black Rock, N. Y., aged forty. During several years had an indirect inguinal hernia, which had gradually descended into the scrotum, and was at the time of the operation very large. He was exceedingly fat, weighing probably two hundred and fifty pounds. The strangulation

¹ New York Med. Times, for 1855, vol. iv., p. 109.

² Wien, Med. Woch. 1859, S. 848-49-51. Schmidt's Jahrb., 107, 215.

took place September 7, 1852, the day previous to the operation. Some attempts had been made to reduce it before my arrival. The patient was vomiting and was suffering greatly from abdominal pains. The bowels were obstinately constipated.

After having placed him under the influence of ether, taxis was made, but to no purpose, and I proceeded at once to the operation. The integuments and subjacent tissues were much infiltrated with serum, and the hernial sac was only reached after the incisions were extended to a depth of two inches. The sac contained considerable serum, which was, however, inodorous. A large coil of intestine was exposed, of a dark brown color, and with slight, recent adhesions. The stricture was found to be at the internal ring. This was divided within the sac, by cutting upward and outward. The hernia was then easily returned, after breaking up the adhesions with my finger, and the wound was closed by several sutures, adhesive plasters, and a compress. His recovery was speedy and uninterrupted.

Remarks.—Obesity in itself does not favor the occurrence of hernia, unless it be one particular form of hernia, namely the omental; indeed, I think it constitutes, in most cases, an impediment to its descent; but persons who have been fat and have suddenly, from any cause, emaciated, are very liable to hernia. The fat being removed from the natural openings, or from the interstices between muscular or tendonous fibres, opportunities are left for the hernia to escape. Moreover, the subcutaneous areolar tissue remains thereafter loose and unresisting, as does also the skin itself.

If, however, fat people are no more prone to hernia than others, their herniæ are generally found more difficult to reduce, and to retain in place. The tumor cannot be grasped and manipulated as fairly, nor can the taxis be directed as skilfully; and, when reduced, the truss cannot be applied as accurately and steadily.

CASE XXV.—*Indirect inguinal hernia; enterocele; strangulated four days; operation by Dr. Markoe; division of stricture within the sac; cured.*

August Haufman, aged fifty-two, admitted to ward 10, Bellevue Hospital, February 9, 1868. Twenty years ago, the patient strained himself, and, immediately after, a small swelling appeared in his groin, which gradually increased in size.

February 8th.—The gut, which had hitherto been reducible, protruded, and taxis was tried without avail.

February 11th.—Ice applied, and taxis again employed without success. Vomiting, and tenderness over the tumor. Has had two stools since admission.

February 12th.—Dr. Markoe, visiting surgeon, operated, and on opening the sac there were found serum, clotted blood, and a knuckle of small intestine, which was congested. The stricture was divided and the hernia reduced. The wound was closed with interrupted sutures, an opening being left at the lower part for drainage. The dressing consisted of simple cerate, lint, and spica bandage. The patient rallied well from the operation. Discharged cured, March 8, 1868. *Reported by T. Cross, M. D., House Surgeon.*

CASE XXVI.—*Indirect inguinal hernia; not congenital; enterocele; strangulated twenty hours; operation without anæsthesia; stricture at internal ring; division within the sac; secondary hæmorrhage; recovery.*

September 20, 1857, I was called to operate upon John Maloney, of Dunkirk, N. Y., aged about thirty-five years. He had had a hernia in the right inguinal region for many years. About twenty hours before I saw him it had become strangulated. Dr. Irwin had attempted to reduce it, but had failed. The swelling was now very large and exceedingly tender. He was constantly vomiting. After a moderate attempt at taxis, we proceeded at once to operate. No anæsthetic was employed. The tegumentary incisions were free, but no vessels required the ligature. The sac was found filled with blood and serum. The intestine was very dark, but not

gangrenous. The stricture was at the external ring; and, after incising its margin, the intestine was returned.

The wound was closed in the usual manner, and several hours after I left for home, the patient remaining in care of Dr. Irwin; who subsequently informed me that a hæmorrhage occurred from some part of the wound, causing the serotum to rise into a swelling of the size of a fist; and that this was followed by a slough. His recovery was, in consequence, much retarded, but it finally took place.

Remarks.—The notes of this case are incomplete, but the large amount of blood found in the sac indicated, I believe, a rupture of some of the mesenteric vessels, as a consequence of the strangulation. The serum was not simply stained with blood, as it is pretty often found to be, but the blood was in masses, more or less separated from the serum.

The subsequent hæmorrhage was probably from some of the vessels of the serotum; and illustrates the danger from this source, which all surgeons have observed, when great care has not been taken to secure such vessels as have retracted into the loose cellular tissue of these parts. It will be remembered that no vessels were tied during the operation, as none seemed to require the ligature. It is quite probable that, if the wound had been kept open longer, and the hæmorrhage solicited by warm applications, vessels requiring the ligature would have been found, and this secondary bleeding would have been avoided.

CASE XXVII.—*Indirect inguinal hernia; not congenital; enterocele; strangulated twenty-four hours; moderate taxis; operation under ether; stricture at internal ring; divided within the sac; recovery.*

Frederick Braumlich, of Buffalo, N. Y., aged thirty-eight, had an indirect inguinal hernia of the left side fifteen years; had worn a truss. Strangulated occasionally before, but he had always succeeded in reducing it himself. April 17, 1853, it became strangulated and he was unable to reduce it. On the following day he was found suffering great pain, with nausea and vomiting. After the trial of taxis, and having administered ether, I operated, dividing the stricture at the in-

ternal ring. The sac contained a knuckle of intestine moderately congested, no adhesions. The wound was closed by sutures, etc., and his recovery took place without a single untoward symptom.

Remarks.—This operation was made after only a moderate trial of taxis, and before either the sac or the intestine had become greatly inflamed. The result justified the practice, since the recovery took place in less than the usual period, and with no accidents.

CASE XXVIII.—*Indirect inguinal hernia, with violent laceration of the fascia transversalis, etc. ; become straight ; enterocele ; strangulated about two hours ; operation after moderate taxis, without anæsthetics ; stricture at external ring ; death in a few hours from shock of the original injury.*

Michael Murphy, aged forty, a cartman, admitted to the Buffalo Hospital of the Sisters of Charity, August 3, 1848, having been caught between his cart and a locomotive engine, causing the sudden protrusion of an old hernia on the right side, through the external abdominal ring. One hour after the accident I found him pale, his face covered with a cold sweat, his pulse scarcely perceptible at the wrist, vomiting, and apparently *in articulo mortis*. According to the best information we could obtain, it had been originally an oblique hernia, but it now presented the appearance of a direct hernia.

We made some attempts to reduce the hernia by taxis, but, failing, I proceeded at once to operate. The fascia transversalis, and other structures in the neighborhood, were found extensively lacerated ; the sac was firm and much thickened, as it is often in old herniæ, but not torn. It contained intestine, with some bloody serum. There were a few slight and apparently recent adhesions. The stricture was wholly at the external ring. I divided the stricture ; tore up the slight adhesions, and returned the intestine.

The patient never recovered from the shock of the injury, but died a few hours after the operation was made. The friends would not permit an autopsy.

Remarks.—It is apparent that this man died of the in-

ternal injuries received, independent of the occurrence of the hernia, and of the operation made for its relief. It is not improbable, indeed, from the rapidity and manner of his death, that there was a rupture of some of the viscera of the belly, causing a fatal internal hæmorrhage. It would be entirely proper, therefore, to exclude this case in an analysis of the cases of strangulated hernia resulting in death.

CASE XXIX.—*Indirect inguinal hernia ; become straight ; not congenital ; enterocele ; strangulated twenty-four hours ; prolonged taxis ; operation without anæsthetics ; stricture whole length of canal ; divided within the sac ; death in forty-seven hours.*

Aaron Sperry, of Chili, Monroe County, N. Y., aged fifty-one, rather corpulent. Had an indirect inguinal hernia of the right side many years, until the canal had become straight, so that it was made to resemble a direct hernia. June 7, 1841, it became strangulated, and was with difficulty reduced by his surgeon. June 15th it again became strangulated, and the same surgeon was unable to reduce it. The means employed were such as were generally authorized before the introduction of anæsthetics. He was bled to syncope ; he was directed to chew tobacco and swallow the juice until it caused nausea ; injections of castor-oil were given until they produced considerable fecal evacuations ; cold applications were made to the tumor, and taxis was diligently employed in the usual manner.

Nausea and vomiting continued until the morning of the 16th, when he was given forty drops of laudanum. At six o'clock on the morning of this day I found his bowels very tender, the hernial tumor large and tender from repeated efforts at reduction, and the patient inclined to sleep, from the effects of the laudanum. In presence of Dr. Wells and several other surgeons I immediately proceeded to operate.

The external incision was five inches in length. Only two fasciæ could be distinctly made out, namely, the fascia superficialis and the fascia cremasterica ; the latter was thickened and inseparable from the sac, so that, as Scarpa has observed, it might easily have been mistaken for the sac itself. The sac

being opened, gave exit to about three ounces of serum. The intestine, which proved to be a portion of the ileum, was of a dark-red or brown color. There were no adhesions. The intestine contained only gas. The stricture or narrowing extended the whole length of the canal. A probe-pointed bistoury was introduced, and the canal was incised through its whole length, the edge of the knife being directed upward and forward. When the knife reached the internal portion of the canal, or the internal ring, and it was being cut, the patient complained of a sharp and intense pain, which was followed by excessive prostration and a cold, clammy perspiration. The intestine was now easily reduced. The pain caused by the incision continuing after he was laid in bed, we gave him eleven drops of laudanum, and this was repeated at the end of an hour.

I did not see my patient after this. At three o'clock, P. M., he was bled sixteen ounces by Dr. Wells, which diminished the tenderness of his bowels, and gave him considerable relief as to the pain.

June 17th, his bowels had become more tender, and, notwithstanding his physician had given him castor-oil, and other cathartics, his bowels had not moved. From this time he sank rapidly, and died forty-seven hours after the operation, and ten minutes after signing his will. No autopsy was permitted.

Remarks.—To those who practised surgery twenty-five years ago, there will be no novelty in the treatment pursued before the operation, unless it be in the use of tobacco through the stomach. There were precedents at that time for even this, but the general practice was to use tobacco enemata, in accordance with the advice of Professor William Gibson, of Philadelphia, and other distinguished surgeons; and I have myself once or twice seen a strangulated hernia reduced by this method. I have, however, always regarded the practice as unsafe, from the excessive irritation which it was likely to produce in the lower portion of the alimentary canal, and from the great prostration which it sometimes induced. It is well, I think, that it has been abandoned.

The narrowing of the entire length of the canal has been

noticed in other cases of old indirect hernia, even when they were not congenital.

A point of special interest is the severe pain inflicted by the incision of the internal ring. Before the introduction of anæsthetics I had occasion to notice this fact several times; and I used to think I could pretty certainly prognosticate a fatal issue when the patient cried out at this moment. The peritonæum has, in its normal condition, very little sensibility, but when acutely inflamed it becomes exceedingly sensitive, and the sharp pain only indicated the existence of acute inflammation, and thus became an indication of what was to be the probable result.

CASE XXX.—*Indirect inguinal hernia; not congenital; enterocele; strangulated nine hours; violent taxis; operation under chloroform; stricture at external and internal rings; cut within the sac; death in thirty-six hours; extravasations of blood from taxis.*

March 6, 1869, Patrick Donovan, aged sixty-eight, admitted to ward nine, Charity Hospital, Blackwell's Island. Had an indirect inguinal hernia on the right side fifteen years. Never been strangulated before. About five o'clock, in the morning of the day on which he was admitted, while lying in bed, he found it strangulated, and he was soon after carried to the hospital. The experienced house-surgeon, Dr. Inches, endeavored for some hours to reduce it by taxis, and by placing him in a warm bath.

When I saw him on my regular visit to the hospital, at 2 p. m., it had been strangulated nine hours. It occupied the scrotum, and was very large. He had vomited some, but was not much prostrated. After repeating the effort to reduce the hernia by taxis, and by elevating the lower portion of the body in the manner particularly described in other cases, both before and after the exhibition of chloroform, I proceeded to operate.

The sac was thin, and contained only small intestine, with about half a pint of bloody serum. No adhesions. Intestine injected and thickened. Strictures existed at both the external and internal rings. I could, however, easily pass my fin-

ger through the rings beside the gut, into the belly, but it was found impossible to reduce the gut until both strictures were divided. The internal ring was nearly opposite the external.

In closing the wound, after reducing the intestine, a procedure was adopted which is probably unusual. The edges of the sac were brought first carefully together and closed by five sutures, nearly to the bottom of the pouch. After which the integuments were closed by sutures also. A compress was placed over the internal ring secured by a bandage. Patient was ordered half a grain of opium every six hours.

This man died in about thirty-six hours, with signs of peritonitis. A note received from Dr. Inches, after the autopsy had been made, informs me that taxis was first made by the house surgeon, at the almshouse; that, on his arrival at the hospital, it was repeated by himself; then by his assistant; while in the warm-bath it was tried again for half an hour; subsequently the assistant tried for one-quarter of an hour; and finally, for the sixth time, it was attempted by myself. Some of these attempts, he states, were made with violence. The autopsy disclosed not only the ordinary signs of peritonitis, but extravasations of blood under the peritoneal coverings of the intestine and of the mesentery to the extent of fifteen inches; and he properly concludes that the fatal peritonitis was more due to the taxis than to the strangulation or the operation.

CASE XXXI.—Indirect inguinal hernia; enterocele, with large mass of mesentery; not congenital; strangulated nineteen hours; moderate taxis; operation under ether; mesentery incised through mistake; stricture at external ring; cut within the sac; death in forty-eight hours, from peritonitis.

M. Cook, aged sixty-six, admitted to Bellevue Hospital, April 23, 1868. The hernia, which had existed for eighteen years, had been kept in position by a truss almost constantly. At 2 A. M., April 23d, while the patient was in bed, with his truss on, the hernia came down, and he was unable to reduce it. In the afternoon it became very painful, and he vomited a green-colored material. Admitted to the hospital 7 P. M.,

when, on examination, a very large tumor was discovered in the scrotum, on the right side, which was tympanitic, but gave no impulse upon coughing. Near the external ring could be felt a hard constricting band. Taxis was immediately resorted to, but failed. Patient put in a hot bath, and I was called.

At 9 p. m. I found the hernia very large, tender, and painful; after a moderate attempt at taxis, he was placed under the influence of ether, and with the light furnished by candles, the operation was made. The incisions were made with my usual care, the blood not being allowed at any time to obscure the surface of the wound. After traversing several fasciæ, an opaque layer was brought into view, but, as this was an old hernia, I presumed it to be the fascia transversalis thickened. It did not separate itself from the overlying fascia, and as the sac had not yet been recognized, and no fluid had escaped, no suspicion arose that the sac had already been opened. Nearly all the house staff were present, holding the candles and assisting, and looking intently, with myself, at the wound. After a moment's delay, therefore, I made in it a long superficial incision, and found that I had penetrated its thickness, and that as the edges spread asunder, a still more opaque or whitish substance was presented below. Now, for the first, I began to suspect that I had before me the mesentery. A little further investigation proved this suspicion correct. A large coil of small intestine occupied the lower portion of the sac; and this opaque structure which I had incised was the mesentery dragged down, presenting a broad, smooth, convex surface in front, and occupying the middle and upper half of the hernial pouch. It was pushed forward with much force, and, being slightly adherent, it did not separate from the sac when the latter was incised.

The error being detected, the sac was more freely laid open and the intestine examined, which was found to be much congested; but the sac contained only a little serum at its fundus. The stricture, at the external ring, was divided. I then closed the wound in the peritonæum covering the mesentery, with four fine silk sutures (there was no hæmorrhage from the mesentery), and reduced the intestine, with the mesentery, easily. The external wound was closed with sutures, a com

press, and roller. On the following day, while vomiting, the hernia escaped between the sutures, the compress having become displaced. He died in about forty-eight hours, from peritonitis. An autopsy was made by my request, but the result was not recorded, because the medical officer whose duty it was to make the record thought I would prefer that such an error should not be made public.

CASE XXXII.—Indirect inguinal hernia ; enterocele ; strangulated eight days ; sac opened by Dr. Sands, and gut reduced without dividing the stricture ; death on third day.

Leonard Buier, aged thirty-seven, admitted to Bellevue Hospital, ward 5, January 19, 1866. Visiting surgeon, H. B. Sands, M. D. Had a double inguinal hernia for twenty-eight years, but has suffered very little inconvenience, as the gut on both sides was very easily reduced. Thursday, June 15th, while at work, the gut on the left side suddenly protruded, and on attempting to return it, he found himself unable to do so. He then went to a dispensary, where ice was applied and taxis used, but without success. On admission, said that he had had no passage from his bowels since Thursday, the 15th instant. Complained of pain over the lower part of abdomen, and vomited at intervals. His pulse was good. He was etherized, cold applied to the tumor, and attempts made to reduce it, which, however, failed.

June 23d.—Vomiting continues. Patient seems to be suffering more pain, tenderness on pressure over the abdomen; pulse one hundred and twelve. Dr. Sands operated at 6 p. m. The sac was opened, and the gut reduced without the division of the stricture. A quantity of dark-colored fluid escaped from the sac; the gut was slightly congested. After the operation, the patient's pulse was one hundred and fourteen. Had cold clammy sweats. Abdomen slightly tympanitic, with pain on pressure in the left iliac region.

He was put under the influence of morphine immediately, and its effects were maintained, with from forty-five to ninety-five m. of Magendie's solution daily, until death, which occurred on the third day.

Autopsy.—There were signs of general peritonitis; lymph uniting the opposed surfaces of the intestines. Very little serum. The inguinal canal was obliterated, the internal ring having been drawn down upon the external. A knuckle of ileum, about four inches from the ileo-cæcal valve, was just within the ring, and attached to its borders by lymph; the peritoneal surfaces of the gut at this point were very much inflamed, but showed no signs of gangrene. The sac was three and a half inches long, and one inch in diameter at its widest part. Within it were $\frac{3}{4}$ ii of serum. The walls of the sac were thickened, and the peritoneal lining was thrown into folds and covered with a small quantity of lymph. *Reported by T. Cross, M. D., House Surgeon.*

CASE XXXIII.—*Indirect inguinal hernia; recent; enterocele; strangulated three days; operation by Dr. Howe; stricture at external ring; death in twenty-nine hours after operation.*

Geo. McConnell, aged —, admitted to ward 16, Bellevue Hospital (Dr. Hamilton, visiting surgeon; Dr. J. W. Howe, house surgeon), September 20, 1867. Had scrotal hernia since August 20, 1867. Had experienced no difficulty at any time in reducing it, prior to Tuesday, September 17th, when, after violent exertion, he was unable to return it. He continued at his daily avocation for three days after this accident, although he had diarrhœa, when he was seized with an acute pain in the right groin, and became aware that the tumor had suddenly increased in size. He was taken home, and soon began to vomit. Had pain in the abdomen, and two loose passages from the bowels. Morphine was given, and hot fomentations applied; but, obtaining no relief, he was brought to the hospital. On admission, patient was suffering much pain, and was vomiting every few minutes. Pulse was weak and rapid. On examination a large scrotal tumor was found, which was shining and red; also resonant on percussion at the lower two-thirds, but dull above. External ring, which was hard and thickened, could be felt embracing the neck of the tumor. Half a grain of morphine was given, and taxis employed, but without success, after relaxing the parts by means of a hot

bath. Patient put to bed and given stimulants, but he still continued to vomit. At 8 A. M., taxis was again employed by Dr. Howe, the patient being under the influence of chloroform; but, this failing, he immediately cut down and divided the stricture, which was at the external ring, and returned about six inches of intestine, which was gangrenous, into the abdominal cavity. During operation, the patient vomited stercoraceous matter; afterward was very much depressed, and vomited continually. Died at 1 P. M. the following day. No autopsy. *Reported by T. Cross, M. D., House Surgeon.*

Remarks.—This patient was admitted to one of the wards under my charge, but the case never came under my notice. The hernia had existed only one month, and its strangulation was for this reason accompanied with extra hazard.

CASE XXXIV.—*Indirect inguinal hernia; enterocele; strangulated several hours; operation by Dr. Stoddard; incision of external ring within the sac; death in about sixty hours.*

Henry Cooper, admitted to Bellevue Hospital, ward 13, March 31, 1868. Visiting surgeon, T. M. Markoe, M. D.; house surgeon, H. B. Stoddard, M. D. General health good. Had a hernia twelve years. Had always worn a truss. At 10 A. M., March 31st, the gut came down, and could not be reduced. He now suffered considerably with pain and vomiting. Twelve hours after, he was admitted to the hospital, suffering much from pain. A very large tumor was found in the scrotum, soft and elastic, resonant above and dull below. The patient was etherized, and taxis was tried, but without success. Operation was performed by Dr. Stoddard, in which the sac was opened. Considerable serum escaped from the sac, which contained about two feet of small intestine, some parts of which were dark red and mottled, others constricted and of a very dark color. After freely incising the external ring, the protrusion was reduced. The wound was closed by sutures, and a spica bandage applied. Magendie πxv given. Patient kept under influence of morphine until April 2d, pulse meanwhile ranging from ninety to one hundred. Respiration

eighteen to twenty-four. April 2d, pulse one hundred and fifty, respiration thirty-six. Stimulants given. At 10 p. m. patient commenced to vomit, and died suddenly. Autopsy revealed well-marked signs of diffused peritonitis. *Reported by T. Cross, M. D., House Surgeon.*

CASE XXXV.—*Indirect inguinal hernia; probably enterocele; strangulated thirty-six hours; failure of taxis; operation under ether; spontaneous reduction before the sac was opened, and without dividing the stricture; recovery.*

Edward Housman, aged twenty-five, admitted to Buffalo Hospital of Sisters of Charity, December 14, 1851, with a strangulated indirect inguinal hernia of the left side. The hernia had existed several years, and he had worn a truss. About thirty-six hours before admission, the hernia had come down, and he had found it impossible to reduce it. When admitted, the hernial tumor was large, tense, elastic and very tender on pressure. He had severe abdominal pains, and had vomited several times. Taxis had been tried, and since his admission ice-water had been constantly applied. During nearly or quite thirty minutes I tried to reduce the hernia by taxis, but without success.

Believing that there ought to be no longer delay, I at once resorted to the operation, the patient having been already placed under the influence of ether.

While making my incisions, and when I had divided all but the fascia transversalis, at the moment when the sponge was applied to remove the blood from the bleeding surface, a slight gurgling sound was heard, and in a moment the whole hernia had disappeared. The wound was at once closed, and in a few days he left the hospital cured.

Remarks.—The incision extended a little above the external ring, and the margins of the ring were visible, but no portion of it had been divided. The reduction occurred probably independently of the operation, and would have occurred if the operation had not been made. It furnishes no argument, however, for delay in a similar case hereafter, since the proba-

bility of such a fortunate occurrence while the operation is in progress is certainly very small.

CASE XXXVI.—*Inguinal hernia ; strangulated four days ; operation ; death in fifteen minutes.*

John McGuire, aged twenty-six, admitted to Bellevue Hospital, September 18, 1861, ward 7 ; house surgeon, S. Walter Coles, M. D. States that he had had a reducible hernia for eight years, which was caused by lifting a heavy weight. On the 16th of September, the hernia became strangulated, and taxis was employed. On admission, the patient was vomiting, and apparently suffering from peritonitis. The scrotum was enlarged, and occupied by a tumor, which was dull on percussion. Dr. — operated, September 20th, and found the sac of an old hernia, which was filled with serum. Patient died in fifteen minutes after the operation.

Autopsy.—September 21st.—Intestines were much congested. About a foot of the ileum, eighteen inches above the cæcum, was in a gangrenous condition. This had undoubtedly been strangulated, and reduced before patient was brought to the hospital. *Reported by T. Cross, M. D., House Surgeon.*

CASE XXXVII.—*Indirect inguinal hernia ; entero-epiplocele ; strangulated one hundred and twenty-five hours ; operation under ether, by Dr. A. B. Mott ; division of stricture at internal ring, within the sac ; omentum and intestine returned ; death on twenty-fifth day, of pneumonia.*

Hugh Tully, aged forty-five. Admitted to Bellevue Hospital, ward 5, March 24, 1868 ; A. B. Mott, M. D., visiting surgeon ; Albert Strang, house surgeon. Has been a very intemperate man. In 1856, while lifting a heavy block of stone, he felt something give way in the left inguinal region, which proved to be an oblique inguinal hernia. It seldom came down, and then only to a limited extent, and, as the tumor was small, he found no difficulty in returning it. From the time of the rupture until the 20th of March, 1868, he had constantly worn a truss, at which time, by accident, the truss came off, and the hernia protruded. Being unable to reduce it, he waited

four days, suffering, however, no unpleasant symptoms, before he applied for medical assistance. Taxis having been tried at the dispensary by Dr. Janeway, without success, he was sent to Bellevue Hospital. On examination, a tumor was found in the left inguinal region, extending from the internal ring downward along the cord into the scrotum. Throughout its whole course it was hard, with no signs of fluctuation. Below it was symmetrical, even and oval in outline. Dull on percussion, with slight tenderness on pressure. The testis could be detected below and behind, both by its shape and by the sensation produced by pressure. The patient's bowels were regular, and he passed his water freely. His tongue was clean, pulse and respiration normal, and he was up and about the ward. There was, however, an impulse conveyed to the tumor by the act of coughing. Patient given 1 gr. morphiae sulph.

March 25th.—Patient to-day complains of a sharp pain along the course of the spermatic cord. His pulse is smaller and irritable, but he has not vomited, and feels no nausea.

March 26th.—A consultation was held to-day, and an operation was decided upon. At 2.30 P. M., the patient being under the influence of ether, Dr. Mott made an incision five inches in length, extending from the external abdominal ring along the course of the spermatic cord. The sac was opened, and the constriction divided. The tumor was now found to be composed of omentum, which was tumefied, dark colored, and nearly gangrenous, and a small portion of intestine. The internal ring was divided and the hernia returned. The operation lasted forty minutes: 11 oz. of ether were used. The wound was brought together by sutures and adhesive straps, and a graduated compress placed over the abdominal ring, and secured by a spica bandage. Stimulants and opium were given *pro re natâ*.

March 27th.—Pulse 86, stronger than yesterday, increased temperature of the body, and tenderness of the abdomen. Sulph. morph. $\frac{1}{4}$ gr. given every two hours. Diet, milk and eggs.

March 28th.—Pulse 90, and quite weak, abdomen is still tender. Compress renewed. Lower part of wound united. Over the inguinal canal there was some suppuration, but ex-

isting only immediately beneath the integument and superficial fascia. Compress and bandages reapplied. Olii ricini $\overline{3}$ ss given to move the bowels.

March 29th.—Patient very weak, with some fever. Scrotum slightly erysipelatous. Bandages removed. Quinine and morphia in $\frac{1}{4}$ gr. doses given *pro re natâ*. Lotio plumbi et opii, locally applied.

April 1st.—Pulse 120 and very weak. Respiration hurried. Large bronchial and tracheal râles can be distinctly heard. Wound looks badly.

April 3d.—Has had two passages from his bowels, of a grayish color, and extremely fetid; appetite improving. Pulse 104. Respiration 22. Wound improving. Tinct. opii gtt. xx; olii ricini $\overline{3}$ ss; mucilag. acaciæ $\overline{3}$ iss, given as an injection and internally. Spts. vini gallici $\overline{3}$ i, quiniæ sulph. gr. ii, morphiæ sulph. gr. $\frac{1}{4}$ every two hours.

April 4th.—Pulse 108. Respiration 24. Had four very offensive evacuations from the bowels. Tongue furred and brown. Quiniæ sulph. grs. xxxii, acidi sulph. dil. $\mathfrak{m}$ xvi, aquæ $\overline{3}$ ij. M. Teaspoonful every two hours.

April 5th.—Profuse perspiration. On examination of the lung, pneumonia discovered on the right side, involving nearly one-half of the lung. Pulse 118, respiration 24. $\overline{3}$ j brandy given every two hours, and the same prescription before mentioned continued, with a generous diet of milk and eggs.

April 9th.—Condition of patient much improved. The pneumonia advancing, but the consolidation at lower part of the lung is disappearing.

April 12th.—Patient worse. Pneumonia advancing.

April 14th.—Died at 8 A. M.

Permission was obtained to examine the parts only around the wound. On examination, marked local peritonitis was discovered. *Reported by T. Cross, M.D., House Surgeon.*

CASE XXXVIII.—*Indirect inguinal hernia; omental; strangulated six days; operation without anæsthetics; large number of fasciæ; stricture at internal ring; cut within the sac; excised all of the protruding omentum; recovery.*

Allen McPherson, of Caledonia, Monroe County, N. Y., aged thirty-nine, quite fat; had a hernia five years, during which time he wore a truss, but the hernia was not well retained. February 10, 1841, it became strangulated. His surgeon tried taxis, and then administered large and strong tobacco-enemata, which, the patient said, nearly killed him, but did not reduce the hernia. I saw him February 16th, at two o'clock in the morning, and immediately operated, in presence of Dr. Graham and several other physicians. (The physician who was first called had died suddenly.)

At this time his bowels had not moved in five days; the hernia was very large and tender; abdomen not tender. On making the incision, the coverings were found thickened, and six distinct fasciæ were exposed, and, if I had not been admonished by the patient not to give a lecture, but to proceed with the operation, I have no doubt several more would have been demonstrated. The sac contained a small amount of serum, but it was filled with a large mass of omentum, of a dark-red color, and firmly adherent to the sac on all sides. Most of the adhesions had evidently existed for a long time, as they were long and firm. They were particularly strong at the internal ring, the seat of stricture.

I tore the omentum from the sac, and in the same manner forced the adhesions at the neck. I then cut the stricture; with the edge of the bistoury directed forward. It was now apparent that the mass could not be returned without enlarging the ring to an inordinate size, and I determined at once to excise the whole of the omentum, which I did, leaving only a small portion of the neck, which still retained sufficient adhesion to the neck of the sac not to allow it to be withdrawn into the belly. There was no bleeding from the cut surface of the omentum, and of course no ligatures were applied. The external wound was closed by sutures, etc. The patient made a

speedy recovery ; but, contrary to my hopes, the hernia continued to descend after his recovery, even worse than before the operation.

Remarks.—We see in this example how long the strangulation may exist in the case of an omental hernia without causing urgent symptoms, or inducing fatal congestions.

Several of the older writers, among whom we may now enumerate Sir Astley and Samuel Cooper, and William Gibson, recommended the employment of tobacco-injections in strangulated hernia, but they did not fail to notice that they must be employed with caution. Liston used to declare them always dangerous, and never recognized them as proper agents, however carefully employed. Without taking any part in the discussion of this point, since it is not very probable that remedies of this class will ever be employed again, I wish to observe that I have seen them used with apparently good effect ; a very weak solution being thrown into the rectum, after a few moments a rumbling would commence in the belly, followed by a sudden disappearance of the hernia. This has occurred before the induction of nausea and prostration, at the moment when the tobacco, as it seemed to me, had caused only irritation and considerable vermicular action of the lower portion of the intestinal tube, by which means the hernia was actually pulled back into the belly. In the same manner, I believe, an emetic has occasionally reduced a hernia, as in one case which I shall relate. This was not, however, the theory of those who used to employ these agents, but they believed their agency consisted in relaxing and enlarging the openings through which the hernia had passed, and for this reason they deemed it necessary to cause excessive and dangerous prostration. In my opinion, if employed to the production of muscular contraction of the intestinal tube—vermicular action—nothing would be gained by pushing the influence of the agent further.

The number of fasciæ disclosed is no greater than I have seen in other old herniæ, while, in still others, the fasciæ have been consolidated, condensed, thinned, and almost lost. The small amount of serum is peculiar to omental hernia, that is to

say, there is usually less in omental than in intestinal hernia, with the same grade of inflammation or congestion.

Sir Astley Cooper long since advised, when the omentum was enlarged and adherent to the neck of the sac, to remove a large portion or the whole of the protruding omentum, by the knife, and to return the remainder to the mouth of the sac to plug up the opening.¹ This advice was followed in the above case, but the result anticipated by Sir Astley did not ensue; the hernia continued to descend afterward as before; and indeed it was subsequently larger than before the operation. It is probable, however, that in a certain number of cases the plan would prove successful, especially where the adhesions to the neck of the sac are firm, and have not been much disturbed by the operator.

Sir Astley and Mr. Key call attention to the necessity of tying the arteries of the omentum which may be found to bleed, before returning it to the cavity of the abdomen; and Mr. Key relates a case in which his own omission to do this came near proving fatal; and he recommends that, in order to bring the vessels better into view, the omentum should be unfolded before the excision is made.

In two other cases (Cases LVIII. and LIX.), I have cut away large portions of the omentum, and in neither of these have I found any vessels requiring the ligature. All three have recovered without secondary hæmorrhage. I do not mean to intimate, however, that the vessels ought not to be sought for, and tied if practicable; but I suspect that they are seldom large enough to bleed. Indeed, they have seemed to me obliterated in some way, so that the structure is not so vascular as in the natural condition of the parts. Moreover, in each of the three cases the omentum was adherent at the neck of the sac; and where this is found to be the case, if it be determined to excise, no doubt the safety of the patient might be increased by not disturbing these adhesions.

The uniform recovery of these patients confirms the state-

The Anatomical and Surgical Treatment of Abdominal Hernia, by Sir Astley Cooper; from the second London edition, by C. Aston Key. American edition, 1844, p. 106.

ments of Sir Astley and of Mr. Key that the operation of excision of an enlarged or otherwise diseased omentum is not only proper, but generally unaccompanied with danger. It will be observed in these reports, also, that most of the patients have died in which the omentum has been returned (XXXVII., XLI., XLII., etc.).

CASE XXXIX.—*Indirect inguinal hernia; traumatic; recent; not congenital; omental; strangulated three days; operation under chloroform and ether; cut stricture within sac; death on third or fourth day.*

Mr. Bigelow, of Williamsville, Erie County, N. Y., aged seventy-seven. Had an oblique hernia on left side for several years. March 10, 1859, he was kicked by a horse, causing an oblique hernia on the right side, which at once became strangulated. March 13th, the third day after this accident, I found him very much prostrated, and vomiting. The hernia was large and very tender. His surgeon, Dr. Van Pelt, of Williamsville, had employed every proper means to accomplish reduction, but had failed. I repeated the taxis with the same result; and, after placing the patient under the influence of a mixture of ether and chloroform, I at once proceeded to operate.

The sac contained no intestine, and only a little serum; but it was completely filled with omentum, which was engorged and already attached to the sac by adhesions. Having released the stricture and broken up the adhesions, the omentum was returned into the cavity of the abdomen, and the wound closed by sutures. The pain, which had been great before the operation, did not return with the same degree of intensity.

A few hours later, I left him in charge of his surgeon, and of the result I have only been informed that he died on the third or fourth day, probably of peritonitis.

Remarks.—It is probable that, in this case, the death was quite as much due to the severe injury to the abdominal parietes, occasioned by the blow, as to the strangulation and operation. Such cases always offer an unfavorable prognosis.

SECOND.—ENTERO-EPIPLOCELE.

CASE XL.—*Indirect inguinal hernia; entero-epiplocele; strangulated about twenty hours; very little taxis; operation without any anæsthetic, except whiskey; sac opened, and hernia reduced without cutting the stricture; recovery.*

Michael Braun, aged about fifty. Had a hernia from childhood. Indirect inguinal, left side. The hernia had been strangulated several times before. July 27, 1866, after a debauch on the previous night, he found himself unable to reduce it. About eighteen hours later he sent for a Dispensary physician, but the messenger was unable to procure one. On my arrival I found the hernia very large, tense, but not very tender. He had vomited some, but whether from the strangulation or from liquor could not be decided. He had taken several glasses of liquor during the last few hours, and was quite drunk at the time. Taxis was attempted for half an hour, but without success. With no assistance but a woman with two or three children, and without anæsthetics, I proceeded at once to operate, tying the vessels carefully as I progressed. The sac contained a large coil of the small intestine, a small portion of omentum, and much serum stained with blood and of an offensive odor. The ring was very large, but completely occupied by the protruded mass. Pressing with moderate force upon the piece of omentum, I found it beginning to recede, and in a few seconds it retired completely. With not much difficulty I now reduced the intestine. The reduction was therefore completely accomplished without cutting the point of stricture.

The wound was closed by sutures, and his recovery was rapid and complete.

Remarks.—Taxis, which failed before the operation, was successful after the sac was opened. It was now possible to bring the pressure to bear more effectively upon the protruding viscera, and especially upon the small piece of omentum. It is probable that this experiment would succeed pretty often if the trial were more frequently made. The advantages to the patient from not cutting the stricture, both immediate and remote, are apparent, and need not be stated.

CASE XLI.—*Indirect inguinal hernia ; become scrotal ; entero-epiplocele ; strangulated forty-eight hours ; operation after protracted taxis, under influence of ether ; death from abscess opening into peritoneal sac.*

Jacob Vanderhoff, aged fifty-eight, shoemaker, admitted to Bellevue Hospital, August 14, 1866. Patient was intoxicated at the time of admission, and was sent to a medical ward by mistake. He was not seen by the house surgeon until the following morning. He then gave the following history : When forty-four years old, while in the act of shovelling coal, a swelling made its appearance suddenly in the left groin, from which time it had gradually increased until it occupied the scrotum. He had worn a truss, but the hernia had been imperfectly retained, so that he had often occasion to return it himself. On the 13th of April a larger mass than usual descended, and he was unable to reduce it. The strangulation had continued, therefore, when he came under my notice, forty-eight hours and perhaps longer, yet his bowels had moved once or twice during this time. The tumor now, on the 15th, of very great size, was tender and painful, especially near the neck of the sac. The house surgeon applied ether over the tumor, and tried taxis, but failed. I then attempted to reduce the mass by taxis, with the same result. Ether was now administered, and taxis was repeated, while the lower extremities were very much elevated by placing the feet of the bedstead upon a table. This having failed also, I immediately proceeded to operate. A large mass of omentum was found in the sac, behind which was a loop of intestine of several inches in length. After dividing the stricture, considerable difficulty was experienced in returning the hernia. This was, however, finally accomplished, and the wound was closed with sutures, compress, and bandages.

Peritonitis ensued, and the patient was placed under the influence of opiates. No cathartic was administered.

August 21st, he had a spontaneous movement of his bowels, and his condition seemed to warrant an expectation of his speedy recovery. On the 22d he had a second movement, after which a dose of castor-oil was administered, but not by my

order, which was followed by four evacuations. On the following morning he was suddenly seized with violent pains in the left iliac region, accompanied with tremors, vomiting, etc., and he died on the morning of the 24th, having survived the operation nine days.

The autopsy disclosed the usual signs of acute peritonitis, caused by the opening into the peritoneal cavity of a small abscess which had formed outside of the seat of the stricture and in the vicinity of the internal ring.

Death occurred plainly as a consequence of the abscess which formed outside of the stricture, and which opened internally; from which circumstance the suggestion naturally arises, whether this might not have been avoided by maintaining a free channel for the exit of pus toward the surface.

The full dose of castor-oil, given on the 22d, was injudicious, but was not the direct cause of death.

CASE XLII.—*Indirect inguinal hernia in a female; entero-epiplocele; strangulated two days; operation; stricture at internal ring; divided outside of sac; death six days after operation; autopsy; portion of the omentum still strangulated.*

Ann Kean, aged fifty-two. Admitted to Bellevue Hospital, ward 28, July 18, 1866. Had an inguinal hernia for three years; it first appeared after she had lifted a heavy weight; the tumor at this time was about the size of an egg. It remained of nearly the same size and perfectly reducible until Monday, the 16th inst. Sunday afternoon, 15th inst., was taken with vomiting. Monday morning, noticed that the tumor was twice its original size and very painful; she was now unable to return the gut into the abdomen. She has had continual vomiting, and no passage from her bowels since Monday evening. Dr. — saw the case about 2 p. m., and found that the hernia could not be reduced by taxis. The vomiting, constipation, and pain indicated that the gut was strangulated. He operated immediately. All the tissues about the sac and its contents were lifted with the fingers of the left hand and transfixed with a curved, sharp-pointed bistoury, and cut through from within

outward; the incision divided all the tissues down to the peritonæum. The strictured portion of the ring (internal) was then divided, and the gut returned into the cavity of the abdomen. The sac was not opened. The wound was closed with sutures, and a compress and spica bandage applied: sol. sulph. morphia (U. S.) $\frac{3}{4}$ ss. given.

July 19th.—Since the operation, patient has kept nothing on her stomach: complains of but little pain in the abdomen. Patient was put under the influence of opium immediately.

July 20th.—Vomited constantly to-day until about 8 in the evening, when she ceased for a few minutes. Was given an enema of brandy and egg. Commenced to vomit again.

July 22d.—10 A. M., pulse, 130; respiration, 27. Died at 7.30 P. M.

Post-mortem eighteen hours after Death.—The peritonæum covering intestines was congested. There was very little serum or lymph. The two rings preserved their normal relation to each other. The ilium, about three inches from the ileo-cæcal valve, was found adherent to the internal ring; on tearing this away, its adherent surface presented a livid color, and was quite soft. The hernial sac and a quantity of omentum were found protruding through the ring and lying in the inguinal canal; both were strangulated and of a dark-purple color. The inguinal canal was distended into a large sac, which extended down behind the pubes for a distance of three or four inches. The amount of omentum extending through the ring was considerable, and with the hernial sac quite filled up the dilatation of the inguinal canal. *Reported by T. B. Cross, M. D., House Surgeon.*

B.—INDIRECT INGUINAL HERNIA; STRANGULATED; REDUCED WITHOUT OPERATION.

CASE XLIII.—*Indirect inguinal hernia; strangulated about twenty hours; reduced by taxis aided by posture, after simple taxis had failed.*

A male convict, in the Blackwell's Island Penitentiary, had an indirect inguinal hernia, which had become strangulated. This occurred in the summer of 1865, and one of the house

surgeons of the Charity Hospital had been trying all night to accomplish reduction by taxis alone. When I was called to see him I found the hernia very large and tender, and the condition of the patient alarming. The patient himself wished me to give him an emetic, by which means, he said, it had once been reduced when it was strangulated. I did not think it best to do so; but directed that, while the house surgeon was making preparations for the operation, an attempt should be made to reduce the hernia by posture. Accordingly, the foot-legs of the bedstead were lifted, and placed upon the top of a table, and, while the patient was lying upon this inclined plane, with his head down, moderate pressure was made upon the hernia. It began to diminish in size almost immediately, and in about ten minutes it disappeared altogether.

CASE XLIV.—Some years ago I had a similar case, but of which I have preserved no notes. The patient was a German, of middle age, living a few miles from Buffalo, N. Y., and was under the care of Dr. Ernst Pupikofer, who sent for me to operate. After ordinary taxis had failed, by adopting the method above described we succeeded in effecting reduction.

CASE XLV.—*Indirect inguinal hernia; strangulated eight hours; reduced by application of ice, aided by posture, and the internal administration of morphia.*

Wm. Thomas, æt. 25, came to my office September 14, 1855, with a strangulated indirect inguinal hernia; enterocele; right side. It was an old hernia. The strangulation occurred, eight hours before he called upon me, from lifting. He was quite sick at his stomach, and was suffering acute pain. Assisted by my pupil, he was at once put completely under the influence of chloroform, and reduction attempted by taxis, but without success. He was sent to his home, and, two hours later, I called and gave him half a grain of morphia and applied a bladder filled with ice. In about three hours it retired spontaneously.

CASE XLVI.—*Indirect inguinal hernia ; strangulated three days ; reduction by posture and application of ice, after taxis had failed.*

July 14, 1853, I was requested by Dr. Nott, of Buffalo, to see a man, about fifty years of age, who had an indirect inguinal hernia on his left side, which had existed many years, but which two days before had become strangulated. He was suffering considerably from pain at the seat of stricture, and had vomited occasionally. Attempts had been made to reduce the hernia, but without success. I was also unable to reduce it.

As the symptoms were not very urgent, we decided to keep him on his back, with his knees elevated by pillows, and apply ice in a beef-bladder. During the night the hernia gradually diminished in size, and on the following morning it had disappeared.

CASE XLVII.—*Indirect inguinal hernia ; recent ; strangulated twelve hours ; reduced by careful taxis, continued half an hour.*

G. S., Engineer on the State Line Railroad, had an indirect inguinal hernia on the left side, which had existed only a few weeks when it became strangulated.

I was called to see him by Dr. Lockwood, a gentleman of large experience in Buffalo, N. Y., on the 25th of July, 1854. The hernia, apparently intestinal, had been strangulated about twelve hours, and Dr. L. had attempted to reduce it by taxis. The usual symptoms of strangulation were present.

Placing him upon his back, with the knees elevated, I seated myself beside him, and, grasping the tumor with the four fingers and thumb of my left hand, allowing the fundus of the tumor to rest in the palm of the hand, I made moderate but steady and continuous pressure for half an hour. The hernia began to recede after a few minutes' pressure, and at the end of the half hour it had disappeared altogether.

CASE XLVIII.—*Indirect inguinal hernia in a female ; strangulated at least twenty-four hours ; failure to reduce by ordinary taxis ; reduction effected by Dr. Vance by taxis, aided by posture ; recovery.*

Catherine Taylor, æt. 32. Admitted to Bellevue Hospital, ward 18, August 20, 1868. Was confined one year ago ; had an easy and natural labor, although her convalescence was slow. Two weeks after her child was born, she first noticed a small tumor in her left groin. At intervals she suffered sharp pain in her abdomen, but it generally passed away in a short time. Two weeks ago she had a severe dysentery, from which she partially recovered and resumed her daily avocation. During this attack the hernia gave her intense pain. August 19th, was seized with pain and vomiting, and was greatly prostrated. Having sent for a surgeon, who tried taxis for an hour and a half without success, she was brought to the hospital. On admission she was very much prostrated ; pulse very feeble and quick, eyes sunken, and countenance anxious. Had had no stool for forty-eight hours. On examination, there was found a small tumor in the left groin, above Poupart's ligament, oval in shape, one and a half inches in length, hard and resisting to the touch, and exceedingly tender upon pressure. Dr. Vance, house surgeon, immediately put the patient under the influence of chloroform, raised the foot of the bed, to gain the effect of gravitation, and employed taxis. After half-an-hour's manipulation, succeeded in reducing the hernia, which had been strangulated over twenty-four hours. Her recovery was rapid and complete. Discharged September 4th, with a truss. *Reported by T. B. Cross, M. D., House Surgeon.*

CASE XLIX.—*Inguinal hernia, probably indirect ; strangulated several hours ; successful taxis by Dr. Stoddard ; recovery.*

Charles McBruen, æt. 39. Admitted to Bellevue Hospital, ward 13, April 16, 1868. Has had double inguinal hernia several years. Has worn a truss constantly—the hernia on the left side being the larger—during sleep ; the night before his admission, his truss slipped off, and

on awaking he found himself unable to reduce the hernia. On admission a large tumor was found in the left groin, which was hard, painful, and tender on pressure. There were no other symptoms of importance. Taxis was immediately employed, but without success. Cloths wetted in hot water were constantly applied to the tumor, and the patient put under the influence of ether. Taxis was again resorted to, and, after continued efforts for twenty minutes, a small mass of hardened feces passed through the constriction, and the gut was immediately returned by Dr. Stoddard. A compress and a spica bandage were applied. The patient was discharged April 18th, having had no bad symptoms whatever. *Reported by T. B. Cross, M. D., House Surgeon.*

CASE L.—*Indirect inguinal hernia; strangulated; probably never completely reduced; no operation; death on fourteenth day.*

Bernard Ruin, æt. 36. Admitted to Bellevue Hospital, August 25, 1868. Has had a hernia for eight years, which came on immediately after violent exertion. At first it was very small, and, as the patient constantly wore a truss, it caused him little or no inconvenience. Two days before admission, August 23d, however, the tumor grew very large, and, being unable to reduce it, he called a surgeon, who supposed he had succeeded after two hours' taxis. After the reduction, however, he suffered severely from pain in the abdomen and vomiting. He was brought to Bellevue Hospital, ward 5, and, on examination, a large scrotal hernia was found on the left side, which could be easily reduced, but not retained. The external ring was very large. Patient still continued to suffer pain, accompanied with retching and vomiting. The testicle could be detected within the external ring.—August 28. Patient more comfortable to-day; vomits, and has pain occasionally.—August 31st. Has had no passage from his bowels for two days; abdomen very tympanitic. Turpentine stupes and hot fomentations applied.—September 1st. Materials ejected from the stomach of a green color. Bowels well moved by Croton oil.—September 2d. Tenderness, tympanites and vomiting have disappeared.—September 3d. Appetite returning, respiration in-

creased in frequency.—September 4. Passed a lumbricoid this morning; vomits now and then; at 7 p. m., patient delirious and bathed in perspiration; pulse very feeble; respiration oppressed; eyes sunken and features pinched. Given brandy and laudanum; pain in back; at 10 p. m. very weak; pupils did not respond to light; convulsive movements of muscles of the face, and slight opisthotonos. Died at 10.30 p. m. No autopsy. *Reported by T. B. Cross, M. D., House Surgeon.*

C.—INCARCERATED INDIRECT INGUINAL HERNIA.

CASE LI.—*Indirect inguinal hernia; probably omental; incarcerated thirty days; reduced in ten days, after taxis had failed, by rest, laxatives, and cool water dressings.*

Michael O'Hara, æt. 29, admitted to the Buffalo Hospital of the Sisters of Charity, October 5, 1850, with an irreducible oblique hernia. He had discovered the hernia first about eighteen months before admission. It had often been down, but he had reduced it always easily; but it had now been down twenty days, and he was unable to get it back. The tumor felt solid, and was flat on percussion. It was tender and somewhat painful. His bowels had moved several times since it became incarcerated. He had no nausea or vomiting. It was diagnosticated as an incarcerated omental hernia. We made repeated efforts to reduce it, but without success.

I then directed that he should remain in bed, with the hips and thighs somewhat elevated—that his bowels should be kept gently open, and cool water lotions applied to the tumor. From this day it gradually receded, and on the tenth day after admission it had disappeared entirely. Its disappearance was throughout gradual, at least so the patient informed us.

Remarks.—In this case the incarceration was probably not due to any adhesions, but only to the congestion of the omentum, and possibly also to some swelling of the neck of the sac.

CHAPTER II.—DIRECT INGUINAL HERNIA.

A.—ENTEROCELE.

CASE LII.—*Direct inguinal hernia; enterocele; strangulated six hours; operation under ether; division of stricture within the sac; reduction; recovery.*

Michael McCarty, æt. 42. Admitted to the Buffalo Hospital of the Sisters of Charity, November 3, 1852. A direct inguinal hernia had existed upon the left side several years. He had generally worn a truss, but it had never been well retained. On the morning of November 3d, while lifting, it suddenly protruded below the truss, and at once gave him great pain. He tried himself to reduce it, but was unable to do so. He walked to the hospital within an hour after the accident, and attempts were immediately made by the house surgeon to accomplish its reduction, but without success. When I saw him, six hours after the strangulation occurred, he was vomiting, and was suffering great pain, both at the point of stricture and in the abdomen. After about twenty minutes' trial of taxis by myself, he was put under the influence of chloroform, and the operation made. The sac contained intestine only, filled with gas and hardened feces. It was much congested, but not adherent. The stricture was divided—after a careful examination as to the character of the hernia—by cutting inward toward the pubes. The intestine was then easily reduced. After the reduction I introduced my finger into the cavity of the abdomen, and, by hooking it over the outer margin of the ring, I could distinctly feel the pulsation of the internal epigastric artery.

The wound was closed by sutures, and compress—except at the most depending point. His recovery was rapid and complete.

C.—INCARCERATED DIRECT INGUINAL HERNIA.

CASE LIII.—*Direct inguinal hernia; entero-epiplocele; incarcerated seven days by adhesions; operation; adhesions broken up with the fingers, and ring enlarged with the knife; reduction and recovery.*

September 14, 1858, John Murphy, æt. 43, was admitted into the private wards of the Buffalo Hospital of the Sisters of

Charity, with a direct inguinal hernia of very great size, and which during the last seven days he had been unable to reduce. He stated that the hernia had existed twenty years, but that he had never worn a truss—it had been frequently down in the scrotum, as it was now—and that he had always reduced it easily. He had no vomiting or other signs of strangulation, but I was unable to reduce it. I determined therefore to operate. Having carefully laid open the sac, I found it to contain a large mass of intestine, with a small portion of omentum; considerable serum also escaped. The intestine was quite firmly adherent, throughout most of its surface, to the sac. These adhesions required considerable force to break them up; but this was finally accomplished, some portions having required the knife. The canal through which the hernia had escaped was narrow, but did not actually strangulate the viscera. It was enlarged by cutting upward and inward, and the hernia was then reduced. The wound having been closed by sutures, etc., the recovery took place in a short time, and he was discharged cured.

Remarks.—Most of the notes of this case have been furnished to me by my friend Dr. Lucien Damainville, who was present, and assisted in the operation.

It is probable that, if the operation had been delayed much longer, strangulation would have occurred; and that, in any event, the adhesions, which were certainly now not more than a week old, would have become much more extensive and firm, so as to have rendered it both more difficult and more dangerous to break them up. It is worthy of note that, within a period of seven days, the adhesions were so strong that they could not be easily torn with the finger, certainly not without considerable risk of tearing the intestines.

CASE LIV.—*Direct inguinal hernia; incarcerated by adhesions ten days; patient suffering under Bright's disease; operation by Dr. Sayre; reduction of hernia; recovery.*

Francis McHugh, æt. 54, admitted to ward 5, male, Charity Hospital, in 1868. Direct inguinal hernia on left side; had existed something more than one year. Caused by a strain. Ten days before the operation it came down and could not be

reduced: not strangulated. Dr. Lewis A. Sayre, visiting surgeon, operated in August, 1868, breaking up the adhesions and returning the hernial protrusion. His recovery was complete: but one year later the hernia is found still descending freely into the scrotum, yet easily reduced. He is still confined to his bed from Bright's disease.

CHAPTER III.—FEMORAL HERNIA.

A.—STRANGULATED, AND REDUCED BY OPERATION.

FIRST.—ENTEROCELE.

CASE LV.—*Femoral hernia; enterocele; strangulated four days; doubts as to diagnosis; moderate taxis; operation under ether; cut Gimbernat's ligament within the sac; reduction and recovery.*

Mrs. Catherine Corbert, æt. 40, admitted to ward 18, Bellevue Hospital, January 19, 1867, with a strangulated femoral hernia on the left side. She said the swelling had been coming gradually during the last five years. Two days before admission she lifted a heavy weight, and it suddenly became larger and gave her pain. She began to vomit soon after, and the vomiting continued occasionally until relieved by the operation. The tumor on admission was tense, tender, red, and painful. It was not resonant on percussion, nor was any impulse communicated to it on coughing. Mrs. C. was the mother of several children, and had a free leucorrheal discharge. A suspicion arose in the mind of the house surgeon that the swelling was a bubo, and indeed it had very much that appearance. I expressed an opinion, however, that it was a hernia, but that the case admitted of a doubt. Accordingly, after having attempted its reduction by taxis, and cold water applications having been made steadily for two days, I brought her before the class for an operation. I stated to the gentlemen that the diagnosis was not positive, but that I believed it to be a hernia. Having placed her under the influence of ether, the incisions were carefully made, through a large mass of swollen and infiltrated tissue, down to the hernial sac. The depth of this infiltrated tissue led me at one time, during the progress of the

incisions, to suspect that after all it might prove to be a bubo; but at length the sac was opened and the intestine disclosed. We were not able to recognize at any step of the operation a distinct fascia. The knuckle of intestine was small, but intensely strangulated, it having assumed over a large portion of its surface a greenish hue, and there were points which presented a superficial ulceration. It was adherent to the sac, and its anterior surface was covered with fresh lymph. The amount of serum in the sac was not large.

I relieved the strangulation by a slight incision of the margin of Gimbernat's ligament; the edge of a probe-pointed knife, directed obliquely upward and inward, being pressed against the ligament so as to divide only the fibres on its concave margin. The adhesions having been torn up by my fingers, the intestine was now easily returned within the cavity of the abdomen, but could not be removed from the abdominal side of the ring, owing to certain firm adhesions which bound it to the mouth of the sac. The wound was then closed and the patient was returned to her bed.

During the first twenty-four hours after the operation, one grain of opium was given every four hours. On the second day, the same quantity was given every six hours. On the third day the opium was discontinued.

Vomiting occurred only once after the operation, and the bowels moved spontaneously on the third day.

February 25th, a little more than one month from the date of the operation, the wound was closed, and she was able to sit up.

Soon after this she was discharged cured. One year later an examination of the wound showed a firm cicatrix, and, although she was wearing a truss, I could discover no tendency in the hernia to protrude.

Remarks.—In relation to the difficulty of diagnosis in this case, the reader is referred to the remarks upon case LX. The large size of the swelling was due not so much to the amount of intestine protruded, and to the serum in the sac, as to the engorgement of the tissues outside of the sac, and this circumstance, especially, led those who first examined it to the conclusion that it was a bubo. The result is another confirma-

tion of the soundness of the principle to operate in all cases of doubt.

I have not stated, I think, that this patient said the tumor in her groin was at first, and for a long time, movable. She could move it about, she said. The same fact has been noted in other cases of femoral hernia, especially in women, in whom the cellular tissue is more loose, usually, in this region than in men. Such a statement made by the patient must not be considered, therefore, as proof that the tumor is an enlarged gland.

CASE LVI.—*Femoral hernia; enterocoele; incarcerated by old adhesions; strangulated by Hey's ligament; inflammation and suppuration of sac; operation; death.*

Mrs. Frederick, æt. 53, of Buffalo, N. Y., had a femoral hernia on the right side since she was about 33 years of age, caused originally by lifting, but it never disappeared after she first discovered it. It slowly but steadily increased in size. April 16, 1853, it suddenly became much larger, while lifting, causing abdominal pains and vomiting. Dr. Weiss was called and attempted to reduce it by taxis, cold applications, etc. April 18th, two days after the strangulation commenced, I saw the patient, with Dr. Weiss. She was then vomiting stercoraceous matter; bowels had not moved in forty-eight hours; and she was suffering acute pain in the tumor and in the abdomen generally. The hernia had escaped from the saphenous opening and lay upon the fascia lata, its long axis being directed upward and outward, almost parallel with and only slightly below Poupart's ligament.

Having no anæsthetic, and the necessity for the operation seeming urgent, I at once proceeded to operate, assisted by Drs. Weiss, Daniels, Cotes, etc. Ice having been applied to the skin for about three hours, its sensibility was found somewhat diminished. No vessels required the ligature. The sac was inflamed, thickened, and filled with offensive pus; over more than half its surface it was firmly adherent to the intestine, which alone constituted the hernial protrusion. These adhesions were too close and too strong to be separated by either the knife or the fingers. The knuckle of intestine was of

a dark-brown color, but neither ulcerated nor sloughing. Having divided Hey's ligament, I carried my finger up to the crural ring, and found there was no stricture at this point, the finger passing easily into the cavity of the abdomen, but, as the adhesions could not be divided, the hernia could not be reduced, except partially, a small portion still remaining in the crural canal. Leaving the intestine in this position, the wound was closed by compress and bandage.

Four days later the patient died, the vomiting having continued after the operation as before, and the bowels not having been moved.

The autopsy, made on the following day, showed the intestine still in the crural ring, and so firmly adherent to the sac that in the attempts to tear it away, the intestine was ruptured. There was not the slightest strangulation at the crural ring. The whole surface of the peritonæum, below the umbilicus, was covered with lymph, which had been recently deposited. It was apparent, therefore, that this patient had died of peritonitis, and of intestinal obstructions, caused by the displacement and attachment of the gut in the canal.

CASE LVII.—*Femoral hernia; recent; strangulated; operation; recovery.*

Mary Carney, æt. 45, fell, while intoxicated, down a cellar stairway, striking her belly upon the top of a barrel. Dr. Wilcox, of Buffalo, was called the following morning, September 5, 1856, and found her suffering from the contusions in her belly and groin, but, as she had never spoken of a hernia, and as no positive symptoms of a strangulation were present, the nature of the accident was not suspected.

On the following day I was requested to see her in consultation. There was much contusion and swelling in the right groin, but it was diffused and undefined in its limits. Pressure over any portion of the lower part of her abdomen caused pain, but she was especially sensitive over the region of the external crural ring. The swelling at this point was the greatest, and had a feel of elasticity. The tenderness was too great to allow of any pressure equal to taxis. She had acute, paroxysmal pains in the umbilical region, accompanied with vomiting and

great prostration. The existence of a femoral hernia was suspected, but not confirmed. We ordered cold water applications, and rest in the horizontal posture, with half a grain of morphine.

We saw her again the next day, and found no improvement. Her bowels had not moved since the occurrence of the accident.

The suspicion was now so strong that we had to deal with a strangulated femoral hernia, that it was decided to operate. She was at once placed under the influence of ether, and the operation made by myself, assisted by Dr. W.

The superficial structures, when exposed by the knife, were seen to be much infiltrated with blood and serum; and the sac was found lying directly over the external crural ring, of a globular form, and not thrown upward, as in most cases of slower development. The sac was opened, bringing into view a knuckle of intestine of considerable size, dark with venous congestion, and covered with some flakes of lymph. Taxis was attempted, but without success. I then cut carefully the free margin of Gimbernat's ligament, to the extent of about one line, and, forcing my index finger in between the ligament and the intestine, I enlarged the opening by tearing. The hernia was now easily reduced. Her recovery was slow but complete, and a few months later she applied to me for a truss.

SECOND.—ENTERO-EPIPLOCELE.

CASE LVIII.—*Femoral hernia; entero-epiplocele; strangulated nine days; vomiting of stercoraceous matter; operation under chloroform; stricture at Hey's and Gimbernat's ligaments; division of both; extensive adhesions; excision of large portion of omentum; reduction and recovery.*

Mrs. Catherine Welch, æt. 50, much emaciated and feeble, was admitted to Buffalo Hospital of the Sisters of Charity, October 7, 1856. Mrs. W. had a femoral hernia on the right side many years, which never disappeared entirely, but at some times was larger than at others. She had always been able to reduce it by pressure, however, when it enlarged. Nine days before admission it was forced down by an effort in lifting, and she could not reduce it. A surgeon was called, but he failed

also. The symptoms of strangulation were at first moderate, but they gradually increased in severity, the bowels did not move, vomiting occurred, and on the eighth day she began to vomit stercoraceous matter. On the following day she was brought to the hospital. She was now exceedingly prostrated. The hernia, having passed the saphenous opening, was reflected upward, over the falciform process of the fascia lata, and lay fairly upon Poupart's ligament, inclining upward and inward toward the pubes. It was oblong in shape, and measured about six inches in its longest diameter, by about three in its shortest.

Having administered chloroform, assisted by my house surgeon, Dr. Lemon, I divided the integument over the long diameter of the tumor. The fasciæ and peritoneal sac were thickened. A copious discharge of straw-colored serum followed the incision into the sac, bringing into view a large mass of omentum, of a pink color, and firmly adherent to the sac at many points. The superficial veins of the omentum were large and full of blood. Posteriorly, and to the inner side of the omentum, was a still larger mass of intestines, of a dark-claret color, covered here and there with exudations of lymph. The intestines were not adherent to the sac, but the convolutions were glued together by recent deposits.

Both the omentum and intestine were strangulated over the falciform margin of the fascia lata, and this was cut upward and outward by a probe-pointed bistoury. Attempts to tear the adhesions between the omentum and sac having proved unsuccessful, I cut away a large portion of the omentum, which was found to be quite solid, and no bleeding of consequence occurred from the cut surface. Finding still that neither the intestine nor the remnant of the omentum could be returned, I examined the crural ring, and found a second point of constriction at Gimbernat's ligament. The crescentic margin of this ligament was then divided by a slight incision, and now the intestine was easily returned, and the omentum followed spontaneously. No attempt was made to confine the omentum at the orifice of the ring, and indeed I think it was retained near this point by adhesions at the neck of the sac.

The wound was closed with sutures. A pledget of lint

moistened with cold water was applied, and half a grain of morphine administered by the stomach.

Soon after the operation was completed, the bowels moved spontaneously, evacuating a large quantity of liquid fecal matter. She took half a grain of morphine again at night, and during the following three days she took half a grain daily. Fomentations of warm water were also applied to the bowels constantly after the first day. Her bowels did not move again until the fifth day, when she was ordered half an ounce of castor-oil. This not having caused a movement, she took half an ounce of sulphate of magnesia on the sixth day, from which a free movement was obtained; most of the wound had closed by first intention on the fifth day. The sutures were removed on the seventh, and, on the twenty-fourth day, the wound having entirely closed, and her recovery being considered complete, she was discharged from the hospital.

Remarks.—In this case, as in Cases XXXVIII. and LIX., the omentum had been incarcerated by adhesions, probably some years before the strangulation occurred, and it is doubtful whether the symptoms which finally created the necessity for the operation were not due altogether to the escape and strangulation of the intestines.

The excision of the omentum, practised also in Cases XXXVIII. and LIX., was followed by no bleeding from the cut surface, although the surface had a pink color, and it might have been supposed that the interior would prove to be unusually vascular. A stricture was found at two points, namely, at the saphenous opening and at the crural ring, requiring a division of both before the mass could be returned, although it had been previously reduced in size by excision of a portion of the omentum.

CASE LIX.—*Femoral hernia; entero-epiplocele; strangulated; operation and removal of portion of omentum; complete recovery.*

A woman, about fifty-five years of age, was admitted to ward 9, Charity Hospital, Blackwell's Island, in February, 1865, with a strangulated femoral hernia of the right side. Having placed her under the influence of ether, I operated, and

found the stricture at the femoral ring. The sac contained both intestine and omentum. The omentum was quite firmly adherent to the sac at its neck. I divided the stricture with a long, narrow, probe-pointed bistoury, by cutting upward and inward toward Gimbernat's ligament. The intestine was then easily reduced, but the omentum could not be made to retire, on account of the adhesions. I therefore cut away a large portion of the omentum, and left the remainder *in situ*. No vessels in the omentum required ligatures. The wound was closed without sutures, by adhesive plaster, compress, and bandage.

A few days later I found the wound open, and a knuckle of intestine plainly in sight, but not protruding. It had already become adherent to the sac near its neck, and was not in the least strangulated, therefore I permitted it to remain. The wound gradually closed, and finally, after several weeks' confinement, the cure was complete.

Remarks.—The frequency of adhesions of the omentum to the sac, in femoral hernia, will be referred to more particularly hereafter.

Excision of the omentum with a favorable result, was practised also in cases XXXVIII. and LVIII. In neither case were ligatures required.

The gaping of the wound, and consequent exposure of the intestine, would probably have been prevented had the wound been closed, as is my usual practice, with sutures.

CASE LX.—*Femoral hernia; entero-epiplocele; strangulated; operation; death.*

Mrs. Elizabeth Craigie, æt. 48, of Rochester, N. Y., was seized November 4, 1840, with a severe pain in her abdomen, near the umbilicus, unattended with soreness, and which she considered an attack of colic. No cause could be assigned by herself for this sudden attack, nor was her physician, Dr. Armstrong, a gentleman of large experience, able to find an explanation. She was bled from the arm, and a dose of laudanum was administered; after which the severity of the pain was considerably abated. On the following day, November 5th, the attention of Dr. Armstrong was called to a small tumor

in the left groin, of the size of a hazel-nut, which upon examination he believed to be a femoral hernia. Later in the day, Dr. Moore, a distinguished surgeon of Rochester, and myself, were called in consultation. After a careful examination, we expressed to Dr. Armstrong our opinion that it might be an enlarged gland. At least, it did not seem to us quite certain that it was a hernia. The grounds for this opinion were as follows: *First.* When a girl, a similar swelling existed at this point for several years, which was unaccompanied with pain, did not appear and disappear at intervals, but remained permanently for a long time, and then gradually went away. She had always spoken of this as a "kernel." *Second.* She had never seen any other swelling in the groin until she discovered this to-day. *Third.* This tumor was not tender or painful, all the pain which she now suffered being referred to the belly, and especially to the umbilical region. *Fourth.* The tumor was small, hard, and could not be reduced or diminished, after we had made prolonged taxis. *Fifth.* She had long been subject to similar attacks of pain, etc., in her bowels, which never, to her knowledge, had been accompanied with a similar swelling, but which had always been called colic, inflammation of the bowels, cholera-morbus, etc. *Sixth.* This present attack was preceded by a similar attack only a week or two before, of which she recovered without any medical aid. For all these reasons she was herself convinced that the swelling in the groin had nothing to do with her present symptoms. Her mother had died of a strangulated femoral hernia; and she was herself an intelligent Scotchwoman, having a full appreciation of what a hernia signified.

Dr. Moore and myself concurred fully in the opinion that it was probably an enlarged gland, but that, after all, it might prove to be a hernia; but the symptoms had abated very much in severity, and we determined to delay surgical interference, advising her that, if the tumor should increase in size, or the pain and vomiting should return, we should be immediately notified.

On the following day (November 6th) we saw her again, and no change had occurred in the swelling, but her abdominal symptoms had still further improved.

During the evening of November 7th the pain returned with severity, and the tumor in the groin was found enlarged; but I was not called until the morning of the 8th, when I found the tumor quite large, elastic, tender, and painful. The vomiting and abdominal pains had returned, her pulse was very feeble, and her general system was greatly prostrated. The fact that we had to deal with a strangulated hernia was now settled beyond doubt.

In the presence of Drs. Armstrong, Dean, Moore, Pope, Ford, and others, I proceeded at once to operate. A crucial incision was made over the tumor. The integuments with fat and areolar tissue were nearly one inch in thickness. The sac contained, first, about half a gill of pus, with a little serum and lymph; second, omentum, considerably adherent to the sac at various points, and presenting here and there upon its surface minute points of ulceration; third, behind the omentum a small knuckle of intestine, of a dark-brown color. The stricture was found to be at Gimbernat's ligament. This was divided by directing the cutting edge of the knife inward. Cutting the stricture caused a sharp and severe pain. The intestine was then easily reduced, but the omentum was returned with difficulty, owing to the existence of quite firm adhesions at the situation of the internal opening.

The pain caused by cutting the stricture continued and steadily increased after the operation was completed, extending up to the epigastric region. The vomiting also continued unabated. The bowels did not move, and the patient died in about twenty hours.

Autopsy, a few Hours after Death.—The omentum and intestine were completely within the abdominal cavity, and in no way constricted. The omentum was, however, still firmly adherent to a portion of the crural ring by both short and long bands, some of which were evidently ancient. The intestine which had been strangulated was of a dark-purple color, but not gangrenous; over a large portion of the peritoneal surface there were patches of lymph, with recent adhesions. The cavity of the abdomen contained no pus or blood.

Remarks.—The history of this unfortunate case is full of instruction. We cannot doubt now that the "kernel" which

this woman had first noticed many years before, at the precise point where we finally proved the existence of a hernia, was in fact incarcerated omentum, which gave her at the time no trouble, but which gradually receded and disappeared from the surface. At a later day, when she became subject to attacks of "colic," etc., it was this same omental hernia, still lying within the internal ring, held fast by adhesions, which did not permit it to descend through the external saphenic opening, and which piece of omentum occasionally became strangulated; or, what is quite as probable, a small knuckle of intestine occasionally descended behind the omentum a short distance, and then became strangulated, of which strangulation it was after a time relieved by the spontaneous withdrawal of the intestine; which withdrawal is, I believe, sometimes effected by the mere act of vomiting.

Her mother had died of a strangulated femoral hernia, illustrating the occasional hereditary anatomical formation predisposing to hernia.

We cannot be certain of this fact, but the sudden increase in the size of the tumor, and the aggravation of all the symptoms, during the night of the 7th of November, may imply that up to this moment only omentum was engaged in the stricture, and that these added phenomena indicated the first protrusion of the intestine. The fact, also, that the intestine was not adherent at any point, would tend to confirm this view.

We do not attach to ourselves so much blame for the uncertainty of our diagnosis, as for the omission to operate when we admitted the possibility of its being a hernia. The rule ought to be inviolable, that an explorative incision should always be made if the surgeon entertains a doubt; especially since experience has generally shown that, whenever intelligent surgeons have entertained a doubt whether it is a femoral hernia, or an enlarged inguinal gland, the result has proved that it was a hernia. I shall relate one other case, which has come under my own observation at Bellevue Hospital, illustrating this statement, and many more have been recorded. Samuel Cooper says: "It is frequently mistaken for an enlarged gland." Gibson has said the same. See also Dunglison's

Medical Library, vol. iv., p. 38. Sir Astley Cooper mentions two fatal cases of this kind in his great work on Hernia, American edition of 1844, pp. 203, 204.

Four unfortunate cases are related by Anderson, in his book on Hernia, p. 159. A case reported by Prof. D. Palmer, of Woodstock, Vt., in the *Boston Medical and Surgical Journal*, August 28, 1839, is so nearly a counterpart of my own case, that I think proper to quote it at some length.

A woman, fifty-three years old, was under the care of her physician ten or twelve weeks, for what he considered inflammation of some portion of the abdominal viscera. At the end of this period, Dr. Palmer, being called in consultation, discovered a swelling in the groin. This swelling the patient said had been there two years—sometimes as large as at present, but never wholly absent. It had never caused any discomfort, and was never suspected of being a hernia. On the day preceding Dr. Palmer's visit, it had suddenly increased in size, and the signs of a strangulation became apparent. An attempt was made to reduce it, but without success. The operation was then made, and a piece of omentum was found, tolerably healthy in appearance, behind which was a knuckle of intestine of a dark color. After relieving the stricture, the intestine was easily returned, but, owing to adhesions between the sac and omentum, the latter was returned with difficulty. The patient died the following morning, and, on examination after death, the portion of intestine which had been strangulated was "black," and a part of the omentum was firmly adherent to the neck of the sac. Over a large portion of the peritoneal surfaces were deposits of fibrin, with pus, and other traces of both chronic and recent inflammation.

Dr. Palmer, in the same communication, relates a second case in which the strangulation of a femoral hernia existed twenty-four hours before it was discovered, "the symptoms resembling those occasioned by the passage of a gall-stone rather than those of a strangulated hernia."

There is one point in the history of most omental, femoral herniæ which, if mentioned by surgical writers, has certainly not been given sufficient prominence, namely, that when small,

and at an early period of its progress, it generally feels quite as solid to the touch as an enlarged gland.

The frequency with which we meet with irreducible femoral hernia, as a consequence of such adhesions as existed in this case, has been noticed by Mr. Birkett, in Holmes's Surgery; and he has referred also to Pott, Sir Astley Cooper, and especially Mr. Bryant, as having observed how often *recent* enteroceles, in this situation, have been found irreducible and strangulated, although they are not generally adherent.

CASE LXI.—*Femoral hernia; entero-epiplocele; strangulated; operation; ligation and excision of omentum; death.*

Irishwoman, aged about fifty years, admitted to ward 18, Bellevue Hospital, June 27, 1865, with a strangulated femoral hernia of the right side. The hernia had existed many years, but it had been very well retained with a truss. She is the mother of eight children. The hernia came down six days before admission, and two surgeons tried, but failed, to reduce it. The tumor was now three and a half inches in length, extending from the external saphenous opening upward and outward. No impulse communicated to the tumor on coughing.

Operation, at twelve o'clock at night, under influence of ether. Reached the sac in four or five incisions; tissues much infiltrated; could not recognize the fasciæ, owing to the great infiltration of the tissues with serum. A large mass of omentum occupied the sac, beneath which was a small knuckle of intestine. The intestine was congested, and of a brown or brick-dust color. It was not adherent. The omentum was hypertrophied, but not ulcerated. It was attached to the internal ring, and to the peritonæum a little above the ring, by a single, firm band, which was evidently an old adhesion. The remainder of the omentum was attached everywhere to the sac by short and recent adhesions. There was no serum in the sac.

I tore away the recent adhesions, and cut that portion of the old fibrous band which was within the neck, before I was able fairly to reach the point of stricture at the internal ring.

I then cut upward and inward against Gimbernat's ligament, and enlarged the small opening thus made by tearing it with my finger. I now reduced the intestine easily. The omentum was too large to be returned with safety; I therefore placed a strong ligature about the omentum, near the internal ring, and cut it off. Pushing the stump well up, I left the ligature hanging out of the wound.

No vessel required a ligature during the operation. A compress and bandage were then applied. Her bowels, which had not been moved in six days, were relieved, soon after the operation, by a copious and very offensive evacuation. This was not occasioned by physic, at least not by physic taken after the operation, but was spontaneous. Other movements of the bowels soon followed, and these continued to recur in spite of opiates, causing great prostration, until about forty-eight hours after the operation, when she died. No nausea followed the operation, and I am disposed to ascribe the severe and persistent diarrhœa to the ether; an effect which I have observed several times before, especially when nausea and vomiting do not occur. There was at no time following the operation any sign of peritonitis. The friends would not allow an autopsy.

B.—FEMORAL HERNIA, STRANGULATED; REDUCED WITHOUT A SURGICAL OPERATION.

CASE LXII.—*Femoral hernia; enterocele; strangulated eight hours; reduced by taxis, aided by posture, after simple taxis had failed.*

September 22, 1855.—Mrs. P., of Buffalo, aged forty. First discovered the hernia eighteen months before. One year previous it had become strangulated, and her physician, Dr. Doolittle, applied over the hernia a tobacco-poultice, which caused nausea, and the hernia retired. When seen by me, it had been strangulated eight hours. It was very painful. She had tried to reduce it herself, and had applied tobacco, but to no purpose. She was much nauseated, but whether from the strangulation or the tobacco could not be determined.

Taxis was first attempted as she lay upon the bed, but

without success. We then lowered her head and shoulders, and raised her legs and hips with blankets and pillows, and in about five minutes the reduction was accomplished.

CASE LXIII.—*Femoral ; strangulated ; reduced by taxis.*

Mrs. Maria O'Rourke, aged sixty. Had a hernia for many years, which had often been slightly strangulated, causing severe colic pains. May 26, 1851, became strangulated, and she was unable to reduce it. Found her, after the lapse of several hours, vomiting and suffering severe pain about the umbilical region. Some pain and tenderness in the region of the hernia. She had taken physic, but her bowels had not been opened. I placed her in bed, in the usual position for the reduction of femoral hernia, and by steady taxis the hernia was reduced in about ten minutes.

CASE LXIV.—*Strangulated femoral hernia ; supposed reduction by manipulation, resulting in artificial anus ; cure.*

In January, 1860, I was requested to go to the town of Alden, Erie County, to see—in consultation with Dr. Denison—Mrs. J. R——, aged sixty, who had a strangulated femoral hernia. It had been strangulated two weeks. I was unable to go, and another surgeon, of large experience, went in my place.

Subsequently I was consulted in relation to the same case, and learned that it had been reduced by manipulation. Ten days after the supposed reduction, she had a spontaneous discharge of fecal matter by the rectum. About two weeks later, a slough formed at the seat of the hernia, and the contents of the bowels escaped by the opening thus made.

The fæces continued to discharge by the artificial anus several weeks, but it gradually closed, and the contents of the bowels resumed their natural channel.

When I last heard from this patient, the artificial anus had been closed six weeks, and she considered herself well.

CASE LXV.—*Femoral hernia ; strangulated ; partly reduced by taxis ; patient refused to be operated upon ; death on the twelfth day.*

August 15, 1853, in consultation with Dr. H., of B——. Patient a German woman, who had a femoral hernia on the right

side ten years. At the time of our visit the hernia had been strangulated nine days, and we were informed that, after the bleeding and taxis, which had been performed the previous day, the size of the tumor was somewhat reduced, and she had experienced no pain. Slight vomiting, however, continued. The hernia was not tender to the touch.

No further attempt was made to reduce the hernia, but she was advised to submit at once to an operation. This she declined, for the reason that she felt much better.

August 18th, twelve days after the strangulation commenced, she died. No autopsy was obtained.

CASE LXVI. — *Femoral hernia ; probably intestinal and adherent ; strangulated ; partially reduced by taxis ; artificial anus ; death on the fourteenth day, without operation.*

Mary Maddox, aged twenty-eight, admitted to Bellevue Hospital, ward 28, June 25, 1868. Had a femoral hernia on the left side eight years. Never wore a truss, nor had the tumor ever been reduced. Three days before admission, while exerting herself, was seized with pain and vomiting, which continued up to time of admission. On admission, June 25th, patient was nervous, restless, and occasionally vomited a small quantity of stercoraceous matter. Had passed nothing from her bowels for three days, nor could she retain any food. The tumor was about the size of a hen's egg, with an indurated base, tympanitic and crepitant. Taxis was immediately applied by the house surgeon, Dr. Lockwood, without success. The visiting surgeon came, and employed taxis, and reduced a portion of the tumor. No crepitation felt afterward. Patient's skin now cold and clammy, but she felt less pain.—June 26th, retained some brandy. No perceptible improvement.—June 27th, is better; pulse 100, surface warm, no vomiting; takes brandy, beef-tea, and ice-water. Breath very offensive; has had no passages from her bowels.—June 28th, some tenderness over the abdomen, with tympanites, pulse 104, breath has a fecal odor, no tenderness, nor crepitation in the tumor.—June 29th, pulse 112, very restless, flatulent.—July 1st, pulse 130. Patient more quiet, has a desire to defe-

cate, breath still very offensive, surface warm, retained her nourishment, tumor red, fluctuating, and increased in size. Patient continued to grow weaker until July 6th, when she died. *Reported by T. Cross, House Surgeon.*

Remarks.—The fact does not appear in the records, but the surgeon states that, prior to the death of the patient, it being suspected that there was an escape of the contents of the hernial sac, he opened the tumor, and gave exit to fecal matter, forming thus an artificial anus.

The autopsy gave no additional information.

MEDIAN VENTRAL HERNIA.

CASE LXVII.—*Median ventral hernia, consequent upon atrophy of the rectus abdominis, in a woman laboring under cancer of the uterus.*

Mrs. Angeline Edler, aged thirty years, admitted to Buffalo Hospital of the Sisters of Charity, October 17, 1850, with cancer of the neck of the womb. March 28, 1851, discovered that she had a hernia in the median line of the abdomen, extending from the ensiform cartilage to the pubes, elliptical in form, being several inches in width a little below the umbilicus, at which point it attained its greatest breadth, and terminating in a sharp angle above and below. The hernia occupied the situation of the rectus abdominis, and seemed to be due alone to an atrophy of the muscular and tendinous fibres. She said she had noticed this first about three months before. The uterus was not appreciably enlarged, nor was her abdomen tumid. She had given birth to two children some years before. Before admission to the hospital, she had accidentally fallen against the corner of a table, striking the belly, and thus had caused a miscarriage at three months.

On the 11th of June following her admission, she died, and the autopsy confirmed the existence of cancer of the neck of the uterus, with moderate enlargement of the body of the uterus. The rectus-abdominis muscle had nearly disappeared, and the oblique muscles were also somewhat atrophied. Her whole body was much emaciated.

CASE LXVIII.—*Ventral hernia, probably caused by laceration of the linea alba during labor, extending from the ensiform cartilage to the pubes.*

Mrs. Wilson, aged thirty-three, a large muscular woman, and the mother of five children. She was in labor with her last child about three hours. Three days after the birth of the child she left her bed, and then discovered the protrusion. She consulted me seven weeks after the birth of the child.

I found an elliptical hernia, extending from near the ensiform cartilage to the pubes, not so wide as in the preceding case at its centre, but with its margins more sharp and more clearly defined. It was evidently due, not to atrophy of the rectus abdominis, but to a laceration of the tendinous structure of the linea alba. She stated, however, that she was not unusually large before the birth of the child, her labor was not unusually severe, and she had not felt at the time any yielding or tearing of these parts.

I recommended that she should wear a band, constructed with gores, so as to fit the surface of the abdomen perfectly, stayed along the sides and back with whalebone, secured in place by a strong cord laced along the back; the centre of the stay, where it came together posteriorly, being one or two inches on one side of the spine—and, if found necessary, to add shoulder-straps, to prevent its sliding down.

I have thought it proper to designate the form of ventral hernia described in the two preceding cases, “Median Ventral.” Such herniæ are not very infrequent, as the result of laceration of the tendinous structure of the linea alba, in consequence of severe labor; but I think it is unusual to find it of such great length, and occasioned by a labor so easy and short as in the case of Mrs. Wilson.

CASES NOT CLASSIFIED.

CASE LXIX.—*Varicose veins in vagina, simulating vaginal hernia.*

August 29, 1854, Mrs. W. S. consulted me in relation to a supposed vaginal hernia. She was a young married woman, in excellent health, and eight months gone with her first child. About two months before, she began to feel something descend

in her vagina when she stood erect, and especially when she lifted. Examining her in the erect posture, a tumor was discovered in the vagina, on its posterior and left lateral wall, occupying the upper two-thirds of the canal; pyriform in shape, being about three inches in length by one inch and a half at its widest part; its neck terminating above posteriorly, and to the left side of the vaginal *cul-de-sac*. It was tense, elastic, but, being grasped firmly, the interior felt like a bundle of large earthworms. Upon the surface of the left labium a number of large varicose veins were discovered.

Pressing upon the tumor more firmly, while she was still standing, it was made gradually to retire, and finally to disappear altogether; but its disappearance was not accompanied with any gurgling sensation, nor was I able at this time, or in my subsequent examinations, to find any orifice through which it had escaped.

In the recumbent posture it retired very slowly, without pressure.

I attended this lady in her confinement, October 10, 1854. Her labor was natural and rapid. As the head descended in the superior strait, I thrust the tumor back with my fingers. It would, however, occasionally get in front of the head; but it was always easily replaced by the finger; and at other times the descent of the head would alone seem to reduce it. Finally, when the head fairly entered the inferior strait, it ceased to protrude altogether.

In June, 1857, I attended Mrs. S. in her second labor, at the full period. The tumor had increased some since the first examination, and had annoyed her considerably during the period of gestation; but the labor was again rapid, and accomplished with no more difficulty than in the first instance.

In the period which intervened between the gestations of the first and second child, she had experienced occasional inconvenience from its descent, and for a portion of the time she had worn, at my suggestion, and with comfort, a simple, broad perineal band, made fast behind and in front to a broad pelvic band.

Remarks.—I have thought it proper to introduce this case

because I at one time supposed it was a hernia, but subsequently my opinion was changed.

Its peculiar feel, the existence of varicose veins in the corresponding labia, and the fact that it always retired without the sensations which are usually felt on the recession of a hernia, and my inability to find any opening after its reduction, are conclusive as to its character. Moreover, vaginal herniæ, containing either intestine or omentum, seldom, if ever, occur, except low down in the vaginal canal.

CASE LXX.—Traumatic ventral hernia, containing intestine and the kidney; no operation; death in twenty-four hours.

John Bradley, aged 25, admitted to Bellevue Hospital, ward 5, April 25, 1867. While riding on a street car, the car came in collision with a truck, the shaft of which struck him in the abdomen, and forced him through the window and woodwork of the back of the car. He was immediately brought to Bellevue Hospital, and on admission complained only of general pain. Upon examination, a large tumor was found in the umbilical region, about six inches in diameter, with a broad base, apparently fluctuating, non-pulsatory, dull on percussion, and having very thin walls. Its centre was very greatly ecchymosed, and the whole surface more or less discolored. The tumor was situated a little to the left of the median line, below the level of the umbilicus, in the course of the epigastric artery. Auscultation revealed no murmur. In view of these points it seemed reasonable to suspect rupture of the epigastric artery, with diffuse aneurism. Most of the surgeons who examined it were of the same opinion. At 7 P. M., an hour and a half after admission, the patient had rallied; the pulse became full and regular, and the temperature of the body normal. He now complained of intense pain in the abdomen, and lay in a semi-supine position, with legs drawn up. The tumor seemed to be increasing in size, and was still dull on percussion. Sol. sulp. morph. (U. S.) $\mathfrak{z}$ ss. was given at 9 P. M. Magendie's sol., $\mathfrak{m}$ xx, was administered hypodermically, Friday morning, April 26th. The patient's expression was that of one suffering great pain. Tenderness was now diffused over the whole abdomen; skin

was moderately hot; respiration increased in frequency, and entirely thoracic; pulse 120. There was obstinate vomiting of yellow, curdlike material. The whole of the tumor was now discolored, being of a dark-purple hue, while the integument around it was of a copper tint. The discoloration of the integument of the right side extended from the axilla to Poupart's ligament. At this time the whole of the tumor, as well as the abdomen, was tympanitic, the former crepitating on pressure. At 12 M. the discoloration had diffused itself, and the patient was gradually failing. He had hiccough, and vomited material resembling coffee-grounds. Died, at 8 P. M., April 26th, twenty-eight hours after admission.

Autopsy, eighteen hours after death.

Rigor mortis well marked. Upon removing the integuments of the abdomen, a large tumor, composed of intestines, presented itself. The intestines were adherent to the integument; and the cellular tissue, for a considerable distance, was gangrenous from infiltration of intestinal fluids. Upon more careful examination, the tumor was found to be external to all the muscles and fasciæ, and to extend nearly to Poupart's ligament on either side. In tracing the muscles downward by dissection, under the tumor, a large rupture of the abdominal walls, of ovoid form, was found, $2\frac{1}{2}$ by 3 inches in diameter, situated a little below the umbilicus, and just outside of the left rectus muscles, the border of which could be plainly seen. The abdomen being now laid open, the tumor was found to consist of three feet of ileum, which had been ruptured at a point five feet from the ileo-cæcal valve, the rupture giving exit to a large amount of fluid contents of the gut, and some solid fecal matter. The left kidney had escaped through the opening in the abdominal wall. Some fluid was found in the cavity of the peritonæum, and the peritonæum itself was covered with lymph, causing adhesions between the folds of the intestines. Most of the remaining viscera were normal. The lungs contained a few tubercles; the kidneys were enlarged, but uninjured. Just behind and internal to the left kidney, the psoas muscle was ruptured, and coiled up into a globular mass. The epigastric artery was intact, though one of its small branches was ruptured.

The points of interest in this case are: 1, the difficulty in diagnosis of the precise nature of accident; 2, the escape of the kidney; 3, the rarity of the accident. *Reported by T. Cross, M. D., House Surgeon.*

ANALYSIS OF PRECEDING CASES, AND OBSERVATIONS.

Indirect inguinal, congenital, strangulated, and reduced by surgical operation, p. 147.

CASE I.—Concealed, funicular, enterocele, abnormal formation of ring; ether employed; stricture at internal ring; division inside of sac. Recovery.

CASE II.—Enterocele; scrotal; chloroform employed; stricture at external ring; division of stricture outside of the sac after the sac was opened. Recovery.

CASE III.—Enterocele; chloroform and ether; stricture at both rings; division within sac. Recovery.

CASE IV.—Whether enterocele or epiplocele is not known: scrotal; reduction of hernia by taxis; followed by suppuration of sac; operation under chloroform. Recovery from immediate effects of operation, and death after six months.

Indirect inguinal hernia, congenital, strangulated, and reduced without an operation, p. 155.

CASE V.—An infant; failure of taxis, and reduction by application of ice. Recovery.

CASE VI.—An infant; failure of taxis, and spontaneous reduction. Recovery.

CASE VII.—An infant; failure of taxis alone, and reduction by taxis, aided by posture, the legs and body being held higher than the head. Recovery.

CASE VIII.—Infant, thirteen days old; failure of taxis; reduction by posture while under the influence of chloroform, the child being held up by its legs. Recovery.

CASE IX.—Congenital hernia mistaken for a hydrocele; illustrating a frequent error of diagnosis.

Congenital indirect inguinal hernia in a female, p. 159.

CASE X.—Occurring six weeks after birth, and descending through the canal of Nuck into the pouch of Broca. Reducible.

Inguinal and femoral hernia, containing the ovaries, Fallopian tubes, etc.,
p. 159.

CASE XI.—Congenital inguinal ovarian hernia; suppuration of the ovary.

CASE XII.—Pott's case of double ovarian inguinal hernia, in which he removed both ovaries by excision. Recovery, with loss of sexual traits.

CASE XIII.—Guersant's case of ovarian, probably congenital inguinal hernia; mistaken for a cyst; excision of the ovary. Death on third day.

CASE XIV.—Deneux's case of ovarian inguinal hernia; mistaken for an ordinary hernia; operation; excision of the ovary. Recovery.

CASE XV.—Neboux's case of incarcerated, ovarian, inguinal hernia; operation, and return of the ovary (incarcerated by adhesions) into the cavity of the belly. Recovery.

CASE XVI.—Mulert's case of strangulated ovarian hernia; occurring below Gimbernat's ligament, without distinct hernial sac; operation and replacement of the ovary. Recovery.

CASE XVII.—Mulert's second, strangulated, ovarian, inguinal hernia; reduced by taxis. Recovery.

CASE XVIII.—Krieger's case of strangulated, inguinal, ovarian hernia; operation; the sac contained serum, fat, intestine, an ovary, and a portion of the tube; Krieger ruptured the stricture with his fingers, cut away the fat and a portion of the sac, and then reduced the intestine, ovary, and tube. Recovery.

CASE XIX.—Berard's case of irreducible, inguinal, Fallopian hernia; mistaken for a serous cyst; sac opened by a trocar; operation followed by suppuration of the sac and peritonitis. Death on the seventh day.

CASE XX.—Loeper's case of inguinal, ovarian hernia; operation, reduction of the ovary, and recovery.

CASE XXI.—Billard's case of congenital, inguinal, irreducible ovarian hernia; discovered at the autopsy of a child, who died when seventeen days old.

CASE XXII.—Dr. J. C. Nott's case of inguinal, ovarian hernia; reduced by prolonged taxis. Recovery.

CASE XXIII.—Dr. Willard Parker's case of femoral hernia, containing intestine, the ovary, and the fimbriated extremity of the Fallopian tube; excision of the extremity of the Fallopian tube, and return of the ovary and intestine. Recovery.

Fallopian tube and ovary in an obturator hernia, p. 166.

Ovarian, vaginal hernia, p. 166.

Indirect inguinal hernia, not congenital, p. 166.

CASE XXIV.—Enterocoele; strangulated; operation under ether; stricture at internal ring; division within the sac. Recovery.

CASE XXV.—Enterocoele; strangulated; division of stricture within the sac. Recovery.

CASE XXVI.—Enterocoele; strangulated; operation without anæsthetic; stricture at internal ring; division within the sac; secondary hemorrhage from vessels of scrotum. Recovery.

CASE XXVII.—Enterocoele; strangulated; ether employed; stricture at internal ring; division within the sac. Recovery.

CASE XXVIII.—Enterocoele; laceration of fascia transversalis in consequence of a severe injury; strangulated; operation without anæsthetic; stricture at external ring. Death in a few hours, from shock of the original injury.

CASE XXIX.—Enterocoele; strangulated; prolonged taxis, and internal exhibition of tobacco; operation without anæsthetic; stricture the whole length of canal; divided within the sac; severe pain caused by incision, and consequent prognosis. Death.

CASE XXX.—Enterocoele; strangulated; violent and repeated taxis; operation under chloroform; stricture at both rings; divided within the sac. Death from lesions caused by taxis.

CASE XXXI.—Enterocoele; strangulated; operation under ether; mesentery incised through mistake; stricture at external ring; divided within the sac. Death.

CASE XXXII.—Enterocoele; strangulated; the sac being laid open, the intestine was reduced without dividing the stricture. Death.

CASE XXXIII.—Enterocoele; recent; strangulated; stricture at external ring; operation. Death in twenty-nine hours.

CASE XXXIV.—Enterocoele; strangulated; stricture at external ring; operation. Death in 60 hours.

CASE XXXV.—Enterocoele; strangulated thirty-six hours; failure of taxis; operation; sac opened, and spontaneous reduction of the hernia before division of stricture. Recovery.

CASE XXXVI.—Strangulated four days; operation. Death in fifteen minutes.

CASE XXXVII.—Entero-epiplocele; strangulated one hundred and twenty-five hours; operation; stricture at internal ring; division within the sac; return of both omentum and intestine. Death on twenty-fifth day.

CASE XXXVIII.—Omental; strangulated six days; tobacco injections and taxis; operation without anæsthetic; large number of fasciæ; excision of omentum. Recovery, and subsequent descent of the omentum. Opinions and practice of Gibson, Sir Astley Cooper, and Mr. Key.

CASE XXXIX.—Traumatic; omental; strangulated three days; operation; divided stricture within the sac. Death on the third or fourth day, due rather to the original injury than to the operation.

CASE XL.—Entero-epiplocele; strangulated twenty-four hours; whiskey as an anæsthetic; operation; hernia reduced without dividing the stricture. Recovery.

CASE XLI.—Entero-epiplocele; strangulated forty-eight hours; opera-

tion after prolonged taxis; division of stricture within the sac. Death on tenth day, from peritonitis, and discharge of the contents of an abscess into the peritoneal cavity.

CASE XLII.—Indirect inguinal hernia in a female; entero-epiplocele; strangulated two days; operation; division of stricture at the internal ring outside of sac. Death six days after operation; strangulation not relieved.

Indirect inguinal hernia; strangulated, but reduced without an operation,
p. 190.

CASE XLIII.—Strangulated twenty hours; reduced by taxis, aided by posture—elevating the foot of the bed several feet—after simple taxis had failed. Recovery. Reduction of a previous hernia by an emetic.

CASE XLIV.—Similar to Case XLIII. Recovery.

CASE XLV.—Strangulated ten hours; spontaneous reduction under application of ice, and after administering morphine, aided by posture. Recovery.

CASE XLVI.—Strangulated three days; reduced by posture, aided by ice, after taxis had failed. Recovery.

CASE XLVII.—Strangulated twelve hours; reduced by prolonged taxis. Recovery.

CASE XLVIII.—Indirect inguinal hernia in a female; strangulated twenty-four hours; failure of taxis; reduced under chloroform by taxis aided by posture—elevating the foot of the bed. Recovery.

CASE XLIX.—Strangulated several hours; reduced by taxis under ether. Recovery.

CASE L.—Strangulated: surgeon supposed he had reduced it before admission, but probably he had not. Death on fourteenth day.

Incarcerated indirect inguinal hernia, p. 195.

CASE LI.—Probably omental; incarcerated thirty days; failure of taxis; spontaneous reduction in ten days, by posture, rest, laxatives, and cool lotions. Recovery.

Direct inguinal hernia, p. 196.

CASE LII.—Enterocele; strangulated six hours; operation under ether; division of stricture within the sac; reduction. Recovery.

CASE LIII.—Incarcerated entero-epiplocele; adhesions; operation; adhesions broken up by the fingers, and ring enlarged by the knife; reduced. Recovery.

CASE LIV.—Incarcerated by adhesions; patient suffering under Bright's disease; operation; reduction. Recovery.

Femoral hernia, p. 198.

CASE LV.—Enterocoele; strangulated four days; doubtful diagnosis; operation under ether; division of Gimbernat's ligament from within the sac. Reduction and recovery.

CASE LVI.—Enterocoele; incarcerated by adhesions; strangulated by Hey's ligament; inflammation and suppuration of sac; operation without anæsthetic, after prolonged application of ice; adhesions prevented complete reduction. Death on fourth day. Autopsy showed that the strangulation was completely relieved, and that the intestine could not have been separated and reduced without laceration of its coats.

CASE LVII.—Enterocoele; recent; traumatic; doubtful diagnosis; operation under ether; division of Gimbernat's ligament. Recovery.

CASE LVIII.—Entero-epiplocele; strangulated nine days; operation under chloroform; removal of a large portion of omentum; return of intestine, after dividing stricture at falciform margin of the fascia lata, and at Gimbernat's ligament. Recovery.

CASE LIX.—Entero-epiplocele; operation; return of intestine, and removal of a portion of the omentum. Recovery.

CASE LX.—Entero-epiplocele; strangulated; doubtful diagnosis; operation without anæsthetic; stricture at Gimbernat's ligament divided; pain when the stricture was divided. Death in twenty hours. Reference to similar cases by Samuel Cooper, Astley Cooper, Dunglison, Gibson, Palmer. Frequency of adhesions in femoral hernia.

CASE LXI.—Entero-epiplocele; strangulated; ligation and excision of omentum; cut Gimbernat's ligament; reduction of intestine. Death in forty-eight hours.

CASE LXII.—Enterocoele; strangulated eight hours; taxis and tobacco-poultices failed; succeeded by taxis, aided by posture—elevating the lower extremities and body. Recovery.

CASE LXIII.—Strangulated and reduced by taxis. Recovery.

CASE LXIV.—Strangulated; supposed reduction by taxis; formation of artificial anus; spontaneous cure of artificial anus. Recovery.

CASE LXV.—Strangulated; partly reduced by taxis; patient refused an operation. Death on the twelfth day.

CASE LXVI.—Strangulated; partly reduced; artificial anus formed. Death on fourteenth day.

Median ventral hernia, p. 214.

CASE LXVII.—Consequent upon atrophy of the rectus abdominis, in a woman laboring under cancer of the uterus; no operation. Death and autopsy.

CASE LXVIII.—Consequent upon laceration of the linea alba during pregnancy; no operation. Recovery.

Cases not classified, p. 215.

CASE LXIX.—Varicose veins in vagina; at first supposed to be a hernia; behavior of tumor in parturition.

CASE LXX.—Traumatic ventral hernia, containing kidney, intestine, etc.; no operation. Death in twenty-four hours.

Of 31 operations for strangulated inguinal and femoral herniæ, 15 died and 16 recovered. They are to be classified as follows: 4 congenital inguinal herniæ, all occurring in adults, and all recovered; 19 non-congenital, indirect inguinal herniæ, with 12 deaths and 7 recoveries; 1 direct inguinal hernia, with recovery; 7 femoral herniæ, with 3 deaths and 4 recoveries.

If I exclude the cases reported to me from Bellevue and Charity Hospitals, and speak only of my own cases, the result is a little more favorable; namely, 15 recoveries and 10 deaths, in a total of 25 cases. The reports from these two hospitals include all that can be found upon the records; but these records have, until lately, been very imperfectly kept, and cannot be considered as a representation of the practice or results in either of these establishments.

It will be noticed that, in the cases of inguinal herniæ, the strictures have, with one or two exceptions, been cut within the sac; in Case XLII. the sac was not opened, the stricture being divided without the sac, and the autopsy showed that the strangulation had not been relieved. It is not my intention at the present moment to discuss the relative merits of the two procedures, for, indeed, I am not fully prepared to do so. The recent successful cases of division outside of the sac, reported by that excellent surgeon, Dr. Erskine Mason, one of the visiting surgeons to Charity Hospital, have inclined me to make a fair trial of the method adopted by himself and by some others, whenever favorable opportunities present.

The operation was completed without dividing the stricture in Cases XXXII., XXXV. and XL.

In the examples of congenital strangulated inguinal herniæ, the seat of stricture has been found once at the internal ring, once at the external ring, and once at both.

In the examples of non-congenital strangulated inguinal herniæ, the stricture has been found five times at the internal

ring, four times at the external, once at both rings, and once in the whole length of the canal.

In the examples of femoral herniæ, the stricture has been found once at Hey's ligament, four times at Gimbernat's, and once at both.

Three cases, in which I cut away the omentum, are reported as recoveries; but the fourth case, in which I first ligated the omentum and then cut it away, died. Most or all of the cases, in which an enlarged omentum was returned, died also.

The cases of strangulated herniæ actually reduced by taxis, posture, or other means than an operation, thirteen in number, recovered. Cases L., LXV., and LXVI., were not reduced, and died. Case LXIV. recovered with a temporary artificial anus. I desire to call especial attention to the value of posture as a means of taxis, illustrated by Cases VII., VIII., XLIII., XLIV., XLV., XLVI., and XLVIII.; and particularly to its value in the cases of children.

Cases LIII. and LIV. were incarcerated herniæ, reduced successfully by operations; and Case LI. was incarcerated, and reduced by prolonged rest, etc.

No apology will be required, I trust, for having brought together in this paper all the published cases of ovarian herniæ. They are sufficiently rare and interesting to warrant the special notice they have received. I desire also here to repeat my indebtedness to my friend Dr. C. C. Terry, for his aid in bringing together the literature of the subject of ovarian hernia.

As this paper is going to press, Dr. Terry has sent me a memorandum of an additional case of both ovary and tube in an incarcerated femoral hernia; reported in the *St. Petersburg Med. Zeit.*, for Dec., 1868, and quoted in the *British and Foreign Med.-Chi. Rev.*, July, 1869, p. 272.

IX.—BRIGHT'S DISEASES.

A Clinical Report based on an Analysis of one hundred and two Cases. By AUSTIN FLINT, M. D., one of the Attending Physicians at Bellevue Hospital, etc., etc.

MY clinical records embrace notes of one hundred and two cases of the affections which it has been the custom to include under the name Bright's Disease of the Kidneys. Most of these notes have been made by myself; a very few have been made by others, all the cases having been under my observation. The number of cases which I have observed is by no means represented by those of which I have notes. For several years past, I have been able to keep notes of a small proportion only of the cases of different diseases which I have observed in hospital and private practice. As regards renal diseases, I have noted, of late, chiefly the cases which have served as illustrations in clinical teaching, or which have presented particular points of interest.

Of the notes which I have made of these affections, a considerable proportion are not complete. Many cases came under my observation after a considerable lapse of time from the commencement of the renal disease, and the previous history in these cases is often limited to a few prominent items. Other cases were under my observation only for a limited period, during the progress of the disease, the subsequent history being unknown, and in some cases the patients were not seen until at or near the close of life. Of most of the cases, the records do not consist of notes made from day to day; hence they are deficient in full and minute details. For these reasons, an analysis will not furnish data for determining, numerically, the relative frequency of all or even a consid-

erable proportion of the events which belong to the clinical history of the affections. Notwithstanding these defects, an interrogation of the cases with reference to various points of inquiry will, it is believed, elicit results which will repay the labor of the analysis, and possess value as a contribution to the clinical study of a most interesting and important group of diseases. Much light has been shed on these diseases since the labors of Bright; but they furnish still ample scope for clinical researches, and in the preparation of this report various questions will arise which I shall not undertake to answer.

I have adopted, as the title of this report, "Bright's Diseases of the Kidney," following the example of Dr. T. Grainger Stewart, in his recent work on these diseases;¹ the name "Bright's Disease," as applied to different renal affections, is manifestly incorrect, and it is a simple mode of remedying the error, honoring at the same time the memory of Bright, to say diseases instead of disease.

Proceeding to interrogate my cases, the points of inquiry will be arranged under the following heads: 1. Morbid appearances after death; 2. Fatality and cases of recovery; 3. Antecedent circumstances and the previous history; 4. Symptoms and complications; 5. The progress and duration of the diseases, together with the immediate causes of death; and 6. The treatment.

1.—MORBID APPEARANCES AFTER DEATH.

In 36 of 56 fatal cases, *post-mortem* examinations were made. The points of inquiry under this head relate, *first*, to the lesions seated in the kidneys; *second*, to lesions in other organs, together with the relations between the latter and the different forms of renal disease.

Lesions of the Kidneys.—Without discussing, here or elsewhere in this report, questions concerning the number of Bright's diseases, the grounds for considering them severally as individual diseases, and the pathological processes involved in the different lesions, I shall assume the existence of the following distinct affections: 1. Acute tubal nephritis, adopting this name, proposed by Dickinson, as the most conven-

¹ Bright's Diseases of the Kidneys, 1868.

ient;¹ 2. The smooth white kidney, the morbid appearances due, probably, to the presence of inflammatory products within the tubes; 3. The fatty kidney, the presence of fat within the tubes constituting the most prominent characteristic; 4. The contracted, granular, fibroid, or cirrhotic kidney; and 5. The waxy kidney.

Of the 36 cases in which *post-mortem* examinations were made, in one case the kidneys were not examined, the body being relinquished for dissection, and the only morbid appearances which were noted relating to the heart. In one case the kidneys appeared to the naked eye healthy. In this case albuminuria and general dropsy had existed, and the patient died from pleurisy, with large effusion, and pericarditis. These affections occurred during pregnancy. In one of the cases the two kidneys represented different diseases, one being greatly contracted, and the other enlarged and fatty. In another case one of the kidneys was fatty without cysts, while the other had undergone cystic destruction. Exclusive of these cases, in all the two kidneys were affected in a similar manner, and in about an equal degree, thus exemplifying the law of parallelism. But in three cases the notes which were made of the morbid appearances are not sufficient to determine the form of renal disease which existed.

Eliminating these seven cases, the remaining 29 furnish only one example of appearances denoting acute tubal nephritis. In this case the renal affection was a sequel of scarlatina. The cases furnish only two examples of waxy kidneys. The fact that but a single example of the former, and but two examples of the latter of these affections, occurred in the *post-mortem* examinations, is consistent with the infrequency of the fatal termination of acute tubal nephritis, and with the infrequent occurrence of waxy disease of the kidneys. In two only of the fatal cases was the disease considered to be that known as the smooth white kidney.

In 14 cases the predominant appearances were those of fatty kidneys. In eight of these cases the disease was determined solely by the characters observed with the naked eye.

¹ Pathology and Treatment of Albuminuria, 1868.

In six of the cases the microscopical characters were ascertained. As a rule, the kidneys were more or less enlarged. In the case which furnished the maximum of enlargement, the weight of both kidneys was a fraction under 25 oz.

The disease was contracted or cirrhotic in nine cases. This disease was determined by the gross characters solely in seven, and by the addition of the appearances under the microscope in two cases. The minimum of atrophy in these cases was represented by kidneys which together weighed three oz.

The presence of cysts, apparent to the naked eye, is noted in five cases, two being cases of fatty kidney, two of contracted kidney, and in one case the form of the disease is not determinable.

In a case not included in the foregoing enumeration, both kidneys had undergone destruction from cysts. The volume of the organs was much increased, and the surface of each was studded with cysts, varying in size from that of a filbert to a large American walnut. The cysts contained a dirty-looking brownish liquid. The capsule was closely adherent and could not be stripped off. The whole of the cortical portion appeared to be destroyed. Uræmia was manifestly the cause of death in this case.

Case of Atrophy of the Kidneys, attributable to Hydro-nephrosis; and Death from Uræmia.—The following case does not properly belong in the group of Bright's diseases, and it is not included in the collection of cases, the analysis of which is the basis of this report. I desire to introduce it as a case of interest, and it may be as appropriately introduced here as in any other connection :

Thomas O'Neil, aged forty-two, tinsmith, was admitted into Bellevue Hospital, November 7, 1864. He stated that his existing illness was that of two years' duration. He complained of excessive thirst, and of passing a large amount of urine. These were the only symptoms of disease of which he complained. He had kept at his work until about three weeks before his admission, and he came to the hospital on account of weakness. He had a rather pallid countenance, and appeared to be moderately emaciated. He passed daily about $7\frac{1}{2}$ pints of urine, the specific gravity of which was 1.008; it

was tested for sugar with a negative result, and it did not contain albumen. The bowels were constipated.

November 21st, fourteen days after his admission, he became dull and sleepy. He had previously kept about the ward, and his disease was considered as diabetes insipidus. The bowels on this date were moved by croton-oil. In the course of the day he fell into a stupor. The pupils were normal, and the pulse was 90. On the following morning he was in a state of nearly complete coma. During the night he had a convulsion, and another in the morning on this date. The coma became complete, and he died at noon. The urine, tested shortly before death, was not albuminous.

The record of the *post-mortem* examination is as follows: "The brain showed a moderate degree of congestion, with moderate effusion on the convexity beneath the arachnoid and in the ventricles. The lungs and the heart were free from disease. The kidneys showed extreme dilatation of the calices and pelvis, at the expense of the cortical and the tubular portion. Very little of the excretory portion of the left kidney remained, and the organ presented the appearance of an empty sac. The right kidney was in a similar condition, but the destruction had not advanced as far. Both ureters were much dilated, and contained urine. The muscular walls of the bladder were greatly hypertrophied, and the mucous membrane was thickened. It was thought, by Dr. Flint, that obstruction must have existed, probably at the junction of the ureters with the bladder."

In connection with this case it may be stated that one of the kidneys may be destroyed by hydronephrosis, without any manifestations of disease. At a meeting of the New York Pathological Society, March 10, 1869, Prof. J. C. Hutchison exhibited a kidney completely destroyed as regards its parenchyma. The specimen was from a case admitted into the Brooklyn City Hospital, on account of an injury of the chest, the injury causing death. The other kidney, in this case, which was not exhibited, was considered as diseased, and the urine removed from the bladder after death contained albumen and tubular casts. On inquiry, it was ascertained that the patient, up to the time of receiving the fatal injury, was apparently in

perfect health, daily working as a laborer. His habits were intemperate, and he was intoxicated when he received the injury, which was caused by his being struck with a street-car, when attempting to get on the forward platform.

Lesions of other Organs.—The greater number of the histories are incomplete as regards the appearances of organs other than the kidneys. In general, the notes contain only an account of the liver and spleen, the heart and the lungs. In some cases the lesions of the kidneys are alone noticed. The important rule, of stating in the records that certain organs were healthy, was not observed. For these reasons, the analysis with reference to the association with the different diseases of the kidney, of lesions elsewhere, must be limited chiefly to the organs just named. In the simple case of acute tubal nephritis, there was considerable hydrothorax on one side, and œdema of the lung, without hydrothorax, on the other side. The absence of hydrothorax on one side was explained by the existence of universal, old pleuritic adhesions on that side; there was no pleuritic space in which effusion could take place, and the pulmonary œdema occurred in consequence. The heart in this case was normal. Nothing is stated of lesions in other organs. Death in this case was caused by the hydrothorax, with the pulmonary œdema.

In the case in which the kidneys appeared healthy to the naked eye, there was pleurisy with large effusion in the left side, and thoracentesis had been resorted to. There was recent pleurisy, without much effusion, on the right side. Recent pericarditis also existed. These affections caused death.

In one of the two cases of the smooth white kidney, lesions in other organs are not noted. In the other case, it is only noted that the liver was contracted, the weight being only 2 lbs. 5 oz.

In each of the two cases of waxy kidney, the liver and the spleen were also waxy. In one, the kidneys weighing 9 oz., the weight of the liver was 6 lbs. 12 oz., and that of the spleen 10 oz. The heart, in this case, weighed 11 oz., and the mitral valve was slightly thickened; the lungs contained calcareous deposits, and there were emphysematous lobules. In the other

case, the kidneys weighing 16 lbs. $4\frac{1}{2}$ oz., the liver weighed 6 lbs. 3 oz., and the spleen 1 lb. In both cases the waxy affection was shown by the iodine test.

Of the fourteen cases of fatty kidneys, in four, neither the existence nor absence of cardiac lesions is noted. In seven of the remaining ten cases, the heart was normal. Cardiac lesions were noted in three cases, namely: in one case, the walls were abnormally soft and flabby, but the valves were healthy, and the weight 12 oz.; in another case, the heart was enlarged, weighing 20 oz., the valves being sound; and in the third case there was hypertrophy, the weight being 23 oz., the muscular structure healthy, the mitral valves presenting patches of atheroma, and the aortic valves vegetations. In the latter case the aorta was atheromatous. Atheroma of the aorta is noted in one of the cases in which the heart was normal. Old pericardial adhesions existed in one case in which the heart was otherwise sound.

The condition of the liver is noted in nine of the cases in which the kidneys were fatty. In three of these cases the liver presented nothing worthy of note. Of the remaining six cases, in three it was abnormally fatty in a greater or less degree, but in none of these cases was the organ notably enlarged. In one case the organ was cirrhotic and hobnailed. In one case there was contraction, the weight being only 2 lbs., but the structure appeared to be normal, and in one case the weight was 3 lbs. 2 oz., and the nutmeg appearance was marked. Disease of the heart did not exist in the latter case.

The condition of the lungs is noted in only six cases. In two of these cases it is noted that the lungs were healthy. This was probably true of most or all of the cases in which the condition is not noted. In one case there were small tuberculous cavities, evidently of long standing, with old pleuritic adhesions; in one case there were masses of yellow tubercle in the left lung, the right lung being free from tuberculous disease, and the left pleura contained a pint of inflammatory effusion, recent lymph covering the pleural surfaces; œdema of lung was noted in two cases, in one moderate, and in the other slight.

Œdema of the glottis existed in one case. The œdema was on both sides, and this was the cause of death.

Morbid appearances within the skull are noted in two cases. In one of these cases the brain was congested, and there was considerable subarachnoid effusion, but without lymph. In the other case there was exudation of lymph beneath the arachnoid, on the superior and lateral surfaces of the cerebrum.

Interrogating the notes of the nine cases in which the kidneys were contracted and cirrhotic, in five cases it is noted that the lungs were healthy. Œdema of the lungs is noted in one case. Contraction of the liver is noted in one case, and in one case it is stated that incipient cirrhosis existed. In three cases pericarditis existed. In two of these cases the pericarditis was recent; in the remaining case it may be said to have been chronic, two pints of inflammatory effusion being contained within the pericardium, and the pericardial surfaces coated with lymph. In one case only is the condition of the heart not noted. In five cases the heart was enlarged. The weight in these cases respectively was 24 oz., 16 oz., 26 oz., 19 oz., and 8½ oz. In the last of these cases the volume of the organ was increased, although the weight was within the limits of health. Great mitral contraction existed in this case. In two of the cases the valves were normal, the hypertrophy being simple. In one case it is noted simply that the aortic valves seemed to be attenuated; and in one case there was a calcareous deposit at the base of the aortic valves. It is noted in one case that the brain was congested, and in one case that turbid subarachnoid effusion existed.

In the case in which there was cystic destruction of both kidneys, the heart was hypertrophied, weighing 14½ oz., and the valves were normal. The liver contained some cysts, but was otherwise healthy in appearance.

In the case in which one kidney was destroyed by cysts, and the other kidney fatty without cysts, the heart was enlarged, weighing 15 oz., and the valves were normal. Œdema of the glottis existed in this case. Of the three cases in which the form of renal disease is not determinable, in one the condition of other organs is not noted. In one of the two remaining cases,

the heart was enlarged without valvular lesions; the liver was normal, and there was some subarachnoid effusion. In the other case, the heart was enlarged, the aortic valves were insufficient, and there was a small aortic aneurism. In this case the lungs were emphysematous.

Reviewing the facts noted respecting the associated lesions, it will be seen that they show the coexistence of certain affections in a small proportion of cases, namely, fatty liver, cirrhosis of the liver, subarachnoid effusion, meningitis, pleurisy, œdema of the lungs, pulmonary emphysema, œdema of the glottis, and pulmonary tuberculosis. The coexistence of most of these affections is probably accidental. Considering the frequency of their occurrence in other pathological connections, this statement may be applied to fatty liver, cirrhosis of the liver, emphysema of the lungs, and pulmonary tuberculosis. It is worthy of note that the facts do not show any tendency in Bright's diseases to the last-named affection, to wit, pulmonary tuberculosis. On the other hand, it is probable that the renal diseases have a causative relation with meningitis, pleurisy, and œdema of the glottis, notwithstanding these complications are of rare occurrence.

A reviewal of the facts which were noted in relation to the association of cardiac lesions with Bright's diseases, shows the number of cases in which the condition of the heart was not noted to be ten. Of the remaining 26 cases, in only six was the heart or pericardium free from disease, leaving 20 cases in which the heart or pericardium was affected. As regards the number of cases of the different renal diseases in which the heart was unaffected, the facts are as follows: The heart was not affected in the case of acute tubal nephritis. It was unaffected in five of the 10 cases of fatty kidneys, in which the condition was noted. It was unaffected in none of the seven cases of contracted kidneys in which the condition was noted. The heart was affected in the case of cystic destruction of the kidneys, in the case of cystic destruction of one, and fatty disease in the other kidney, and in the case of contraction of one, and fatty disease of the other kidney. It was affected in the case in which the kidneys were not examined; in two cases in which the form of renal disease was not determinable; in the

case of waxy disease, in which the condition was noted, and in the single case in which the kidneys appeared normal to the naked eye.

As regards the kind of affection of the heart in connection with the form of renal disease, the facts are as follows: Recent pericarditis existed in 3 cases, namely, in 2 of 7 cases of contracted kidneys, and in the case in which the kidneys appeared to the naked eye healthy. Chronic pericarditis existed in one of the cases of contracted kidneys. Enlargement of the heart, without valvular lesions, existed in 4 of the 10 cases of fatty kidneys, and in 3 of the 7 cases of contracted kidneys.¹ Enlargement without valvular lesion also existed in the case of cystic destruction of both kidneys; in the case of cystic destruction of one, with fatty disease of the other kidney; in the case of contraction of one, with fatty disease of the other kidney, and in one of two cases in which the form of renal disease was not determinable. Enlargement without valvular lesions thus existed in 11 of 20 cases of the different renal diseases. Enlargement with valvular lesions existed in 6 of these 20 cases. The coexistence of recent pericarditis and enlargement of the heart is noted in one case. Old pericardial adhesions existed in one of the cases of fatty kidneys.

These facts illustrate the occasional development of pericarditis, especially in connection with contracted kidneys. They illustrate, also, the frequency of simple enlargement of the heart, that is, enlargement without valvular lesions, as a concomitant of Bright's diseases. It is certainly a fair inference, from the infrequency of simple enlargement of the heart except in this pathological connection, that the renal stands to the cardiac affection in a causative relation. On the other hand, the frequency of enlargement of the heart associated with valvular lesions, and the number of cases in which renal disease does not coexist, render it probable that the association of the former with the latter in a certain proportion of cases is due to coincidence. The coexistence of cardiac and other affections with Bright's diseases will constitute points of inquiry relating to symptoms and complications referable to

¹ I include one case in which it was stated that the aortic valves were attenuated.

the different anatomical systems of the body in the fatal cases in which *post-mortem* examinations were not made, in the cases ending in recovery, and in the cases the ending of which is not known.

2.—FATALITY, AND CASES OF RECOVERY.

Of the one hundred and two cases under analysis, death was known to have occurred in fifty-six. In most of twenty-five cases the patients passed from under my observation, the renal disease existing, and the subsequent history was not ascertained; a few cases are known to be still in progress. Eliminating these twenty-five cases, the fatality was fifty-six in seventy-seven cases. The fatal cases will be analyzed, with respect to the immediate causes of death, in another section of this report.

In twenty-two cases the patients were considered as having recovered, making the proportion, in the number of cases in which the result was known, twenty-two in seventy-six cases. Was the recovery complete in these twenty-two cases? This question is especially pertinent in view of the fact that in some chronic cases of Bright's diseases the morbid conditions of the urine temporarily disappear, and such a degree of improvement takes place, as regards other symptoms, that, if the patients be lost sight of, recovery may be incorrectly assumed. It is undoubtedly proper to consider that there is room for the supposition of this being true of some of these twenty-two cases. I shall proceed to analyze this group of cases with reference to the question just raised, as well as other points of inquiry. As regards the completeness of the recovery, the cases are to be interrogated with respect to the urine, the dropsy, and the general health at the time when the patients were considered as having recovered. The health of the patients subsequently, when this was known, has an obvious bearing on the question. The renal disease was a sequel of scarlatina in two cases, and in one case of scarlatina combined with diphtheria. These three cases were in private practice, and in each the patient was known to have been healthy for several years after the date of recovery. In one case the renal disease occurred in connection with pregnancy, and premature delivery of a dead

child took place. There was great anasarca, and hydrothorax, to such an extent that life appeared in imminent danger. This patient, five months after the date of recovery, was in perfect health. This case was in private practice. In another case in private practice, after a year from the date of the disappearance of albuminuria and general dropsy, the patient was free from any evidence of renal disease, but suffered from an enlarged prostate and cystitis. In another case the patient, a young physician, after dropsy and albuminuria had disappeared, was under my observation for fourteen months, and was in good health. He then had double pneumonia, which was followed by a copious purulent expectoration, and he left the country for his health. The subsequent history was not ascertained. In another case, also in private practice, the patient was known to have been in good health for ten years after recovery from dropsy and albuminuria. The remaining fifteen cases were in hospital practice. In one of these cases the patient was known to be well eleven months after the date of discharge. In one case, the patient, a female, was employed as a ward-helper for several weeks after recovery. In another case the patient was known to be at work as a carpenter and well three months after the date of discharge. In the twelve cases which remain, nothing was ascertained of the patients after they had left the hospital.

It is thus seen that doubt as to whether recovery was real can be entertained only as regards the twelve hospital cases just referred to. The facts noted in these cases at the time of discharge are as follows: In all the cases the general health was such that the patients were considered as not requiring further treatment, and as well enough to return to their occupations. In three cases it is noted that, at the time of discharge, the urine was entirely free from albumen. In six cases it is simply noted that the patients were discharged well; the entire absence of albuminuria is not stated, but it may be fairly inferred. In three cases it is noted that there was a trace of albumen in the urine at the time of discharge from the hospital. In these last three cases it is to be admitted that the evidence of complete recovery is not conclusive. While it is probable that, in these cases, the albuminuria did afterward

entirely disappear, it cannot be asserted that the kidneys were healthy when albumen, in never so small quantity, continued to be found in the urine. The probability of complete recovery is certainly greater in the nine cases in which albuminuria did not exist when the patients were discharged. It should, however, be conceded that, for conclusive evidence of completeness of recovery in these cases, the continuance of health, for a considerable period after the disappearance of all the symptoms of renal disease, should be ascertained.

Is there room for doubt concerning the diagnosis of renal disease in any of these twenty-two cases? I can answer this question in the negative. In all the cases the urine contained albumen in more or less abundance. In all there was more or less general dropsy. In the greater number the dropsy was either great or considerable. Moreover, in no case was the dropsy, or the albuminuria attributable to disease of the heart. These facts are sufficient to establish the correctness of the diagnosis as regards the existence of renal disease.

I come now to a question of much interest, namely, what form or forms of renal disease existed in the cases which are considered as having ended in recovery? Undoubtedly, in certain of the cases the affection was that known as desquamative or tubal nephritis. It may be assumed that this affection existed in the three cases in which the disease was a sequel of scarlatina. It was the disease, doubtless, in more or less of the other cases. It must have been the disease, of course, in all the cases ending in complete recovery, if it be true that this alone of Bright's diseases does not involve incurable lesions. But it is by no means certain that all the other diseases are incurable. The smooth white kidney, the fatty kidney, and perhaps, also, the waxy kidney, existing to a certain extent, may not necessarily be permanent. We are not warranted in denying the possibility of complete recovery from these affections. Another important statement may be made in this connection, namely, more or less damage to the kidneys may be produced by these affections, or they may remain permanently to a certain extent, and the functional capacity of the kidneys be amply sufficient for life and health. This statement is applicable to the contracted or cirrhotic kid-

ney, as well as to the other of Bright's diseases just named. The kidneys may be the seat of either of the several lesions which are called degenerative; these lesions, having reached a certain point, may remain, the local disease may cease to be progressive, and there may be no evidence, either local or general, of the existence of any renal affection. This latency and innocuousness of lesions may have been exemplified in some of the cases which appeared to end in recovery. To determine whether this was so or not is obviously impossible.

There are certain circumstances and symptoms which, in some of the cases, establish the diagnosis of tubal nephritis. Such are, the disease occurring after scarlatina, or after exposure to cold and wet; the rapid development of a considerable degree of general dropsy, and hæmaturia or a smoky appearance of the urine with epithelial and hyaline casts. But, in a certain proportion of cases these diagnostic points either did not exist or were not available when the patients came under observation. With reference to prognosis, it is an important fact that, especially in hospital practice, cases may have characters rendering probable the existence of lesions which, in general, involve progressive disease, ending fatally sooner or later, and either complete recovery may take place, or the renal affection may become latent, and, for a time, if not permanently, innocuous. In illustration of this fact I shall subjoin a succinct account of several of the cases.

CASE I.—*Albuminuria and general dropsy, with epileptiform convulsions, coma, and temporary amaurosis. Recovery after thirty-four days in hospital.*

Christina Ella, aged fifteen years, admitted into hospital January 12, 1856. She had been subject to frequent recurrence of attacks of intermittent fever during the preceding summer and autumn. She had never menstruated. At the time of her admission there was moderate anasarca, which had existed for six days. The urine contained albumen in abundance, with numerous granular casts. On the day after admission she was attacked with epileptiform convulsions, and in the course of twenty-four hours she had six attacks. In

these attacks the face was distorted, the lips were covered with foamy saliva, and the tongue was wounded. She complained of cephalalgia prior to and between the attacks. After the attacks of convulsions she lay motionless, in a state of coma, for two days. On the day of the convulsions and the previous day, vision was lost. She emerged from the state of coma, the convulsions did not return, and vision was regained completely in six days; albumen and casts ceased to be found in the urine, the dropsy disappeared, and the patient was discharged, apparently well, after having been in hospital thirty-four days. She was purged freely with croton-oil, when the convulsions occurred. The nitrate of potassa was then given, with a sensible diuretic effect. Subsequently, quinia and iron were prescribed.

CASE II.—*Albuminuria and general dropsy. The patient discharged, well, excepting a trace of albumen in the urine, after remaining in the hospital a month.*

T. George, aged thirty-six, farmer, admitted December 27, 1856. He was accustomed to drink beer freely. He was able to work up to ten days before his admission, when œdema of the face and limbs occurred, accompanied by headache, anorexia, and slight diarrhœa. The urine contained an abundance of albumen and epithelial casts. The anasarca was considerable, and there was dropsy of the pleura and peritonæum. Cephalalgia was a prominent symptom; but convulsions and coma did not occur. After remaining in hospital a month, he was discharged, the dropsy having entirely gone; the urine was free from casts, but it gave a trace of albumen; the appetite and digestion were good, and he felt able to return to his occupation. The treatment was a saline purgative, followed by the bitartrate of potassa, which acted efficiently as a diuretic. Subsequently gallic acid was prescribed.

CASE III.—*Albuminuria and general dropsy; disease of heart. Recovery, and the patient well, eleven months after the date of discharge.*

Mary Tooky, aged eighteen, domestic, admitted January 7, 1861. She had always had good health prior to her present

illness, and her habits were good. She had been ill for three weeks before her admission. When admitted, the urine was loaded with albumen; there was moderate anasarca, with notable pallor of the face. Cephalalgia was a prominent symptom, but convulsions or coma did not occur. A mitral systolic and an aortic direct cardiac murmur existed, but the heart was not enlarged. At the end of two months the patient was discharged, the dropsy having disappeared, the urine being free from albumen and presenting no microscopical characters of disease. Eleven months afterward this patient was in excellent health. She was treated with the acetate of potassa, the tincture of aconite, and the tartrate of iron.

CASE IV.—*Albuminuria and general dropsy; coma; tracheal râles. Discharged well, after thirty-two days in hospital.*

Mary Roberts, aged twenty-nine, domestic, admitted February 10, 1863. She was accustomed to drink ale freely. Her health was good prior to her present illness. She was very stout, weighing 185 lbs. Her illness commenced six days before her admission. Œdema took place, accompanied by vomiting. On her admission there was considerable anasarca, and the urine was highly albuminous, the quantity passed in twenty-four hours being only two ounces. Cephalalgia was a prominent symptom; and on the second day after her admission she fell into complete coma. For a time she seemed to be moribund, the breathing being accompanied by tracheal râles. She emerged from this state after the use of the hot-air bath and free purging from croton-oil. On the thirty-second day after admission she was discharged, apparently well. The treatment embraced the frequent employment of the hot-air bath.

CASE V.—*Albuminuria and general dropsy; hydrothorax. Recovery after four and a half months in hospital.*

Mary Quinn, aged thirty-nine, cook, admitted July 8, 1864. Her illness began thirteen days before her admission. She did not come under my observation until August 1st, twenty-three days after admission. The anasarca, which had been considerable, was then slight, but there was large pleuritic effusion. On both sides, at the level of the liquid, bronchial respiration

and bronchophony were marked. The patient suffered greatly from dyspnœa, and for two weeks she was obliged to keep constantly the sitting posture. The urine was albuminous. Moderate purging with elaterium was kept up for two weeks. The hydrothorax progressively diminished, and she improved in all respects. September 28th she was greatly improved, being up and about the ward; the œdema had disappeared; a little fluid only remained in the pleural cavities, and the urine was free from albumen. She was discharged well in the following November, having been in hospital four and a half months. Aside from the employment of elaterium, the treatment is not noted.

CASE VI.—*Albuminuria and general dropsy. Patient discharged, apparently well, excepting a trace of albumen in the urine, after twenty-one days in hospital.*

Alfred Russell, aged seventeen, laborer, admitted April 12, 1861. He was a moderate beer-drinker. Œdema of the lower limbs and of the face had existed for two months, but he had continued to work until a week before his admission. At the time of his admission the anasarca was considerable. The urine contained albumen in abundance and small epithelial casts. He progressively improved, and twenty-one days after his admission he was discharged, apparently perfectly well, excepting a trace of albumen in the urine. He was treated solely with the bitartrate of potassa, which acted efficiently as a diuretic, the patient at one time passing five pints of urine daily.

CASE VII.—*Albuminuria and general dropsy; large pleuritic effusion; recovery.*

Mrs. H., a young married woman, a patient of Prof. L. A. Sayre, was seen by me in consultation, in October, 1863. She was then greatly anasarcaous, and the lower limbs were enormously swollen. The urine was highly albuminous. She was in the latter part of pregnancy. Premature labor shortly afterward took place. I saw her again on December 6 and 10, 1863. The anasarca was much diminished; but the chest, on both sides, was nearly filled with liquid. Bronchial

respiration and bronchophony existed on both sides at the level of the liquid. The suffering from the want of breath was extreme, and there seemed to be imminent danger of death from apnœa. Notable relief was obtained by the repeated employment of elaterium. Five months afterward I was accosted by this lady in the street, and should never have recognized her. Her appearance was typical of fine health, and she stated that she was perfectly well.

3.—ANTECEDENT CIRCUMSTANCES AND THE PREVIOUS HISTORY.

In this section I shall give whatever facts may be obtained by analyzing the cases with respect to points of inquiry which have a bearing on the causation of Bright's diseases, and the history as regards their development. The first questions which arise relate to sex, age, occupation, and habits of life.

Sex.—Of 102 patients, 67 were males and 35 were females. Of 55 patients, in the cases known to have ended fatally, 34 were males and 21 were females. Of 22 patients who recovered, 13 were males and 9 were females. Of 25 patients, in the cases in which the termination was not known, 20 were males and 5 females.

Age.—In 6 cases the renal disease was a sequel of scarlatina in children; in 3 the age being 6 years, in 1 case 3 years, in 1 case 7 years, and in 1 case 4 years. Eliminating these six cases, the remaining cases, with respect to age, may be grouped into—1st, those which ended fatally; 2d, those which ended in recovery; and 3d, those in which the termination was not known.

In 50 fatal cases the minimum of age was 5 years. This was the age in one case; there is ground for suspecting that scarlatina preceded the renal disease in this case. The next lowest age was 14 years. This, too, was the age in only a single case. The next lowest age was 17 years, and the next 19 years. The maximum of age was 70 years; one patient only was of this age, and the next oldest was 56 years of age. The mean age in this group of cases is a fraction over thirty-six years.

In 18 cases ending in recovery, the minimum of age was 15 and the maximum 63 years. The mean age in this group is a fraction over thirty-two years.

In 24 cases in which the termination was not known, the minimum of age was 24, and the maximum 65 years. The mean age in this group is a fraction under thirty-four years.

The little variation of the mean age in these three groups of cases is worthy of note. The analysis shows that, exclusive of scarlatina, the causes of Bright's diseases are chiefly operative after adolescence and before advanced age.

Occupation.—The occupation is noted in 60 cases, the patients being males in 52 cases. Of the male patients, 18 were laborers, and 7 were merchants. A considerable number of callings are represented in the remainder of the cases, viz.: seaman, 4 cases; shoemaker, 3 cases; carpenter, 2 cases; farmer, 2 cases, and a single case of each of the following: liquor-dealer, boatman, printer, currier, bricklayer, copper-smith, clerk, student, lawyer, physician, banker, gardener, plasterer, furrier, stone-cutter, and coachman. Of the female patients, 7 were domestics, and one was a cook. This analysis goes to show that the cases of Bright's diseases do not pertain to any particular occupation or occupations.

Habits.—Limiting the term habits to those concerning the use of alcoholic beverages, the histories of 38 cases contain information on this point. In the histories of nearly all the cases in which the patients were females, nothing is noted in relation to this point; hence, in most of the 38 cases, the patients were males. Of these 38 cases, in 18 the habits, as regards the use of alcoholic beverages, were good; in 13 cases the patients were spirit-drinkers and intemperate; 3 patients were moderate drinkers; 4 drank malt liquors freely, and in one case it is noted that the patient was a free liver. So far as these facts go they certainly do not show any special causative influence pertaining to the use of alcoholic beverages in the production of Bright's diseases. The cases in which renal disease followed scarlatina are not included among those analyzed with respect to habits.

Exclusive of sex, age, occupation, and habits, various points of inquiry, relating to antecedent circumstances and the previous history, and bearing on the causation of Bright's diseases, suggest themselves. Are the affections of the kidneys preceded by any other diseases sufficiently often to render

probable a causative relation? Are the manifestations of renal disease, meaning, especially, œdema or anasarca and uræmic phenomena, preceded, as a rule, by more or less impairment of the general health; or, on the other hand, do these manifestations occur when apparently the body is in a healthy condition? What symptoms precede the special manifestations of these diseases, viz., dropsy and uræmia? I propose to analyze the cases with reference to facts relating to these and other kindred questions. The histories of 78 cases contain more or less information respecting the antecedent circumstances and the previous history.

Antecedent Diseases.—As already stated, the renal disease was a sequel of scarlatina in children in six cases. In one case it followed scarlatina and confinement; and in another case it accompanied scarlatina, the patient being an adult. Exclusive of scarlatina, the antecedent diseases which are noted are the following: intermittent fever, articular rheumatism, gout, pulmonary tuberculosis, diphtheria, valvular disease of heart, sporadic cholera, syphilis, and diabetes mellitus.

Intermittent fever was an antecedent disease in ten cases. The histories do not enable me to determine in how many of the 78 cases the patients had been exposed to malaria, but all the cases were observed in situations in which intermittent fever is of frequent occurrence. The proportion of cases, therefore, 10 to 78, is not large enough to show any special pathological connection. Moreover, there are probably no grounds for supposing that Bright's diseases are more rife in situations which are malarious than in those in which periodical fevers are never produced. The facts, in the ten cases, relating to the intervals between the last attack of intermittent fever and the first manifestations of renal disease, do not favor the supposition of a causative relation. In only two of the ten cases did the manifestations of renal disease follow immediately an attack of intermittent fever; in four cases it is simply noted that the patients had been subject to attacks of intermittent fever; and in four cases it is stated that an attack had not occurred for periods respectively as follows: three months, six months, one year, and two years. The most that can be inferred is, that in two cases an attack of intermittent fever may have

acted as an exciting cause of the renal disease. The two cases, in which the manifestations of the renal affection followed immediately an attack of intermittent fever, ended fatally; in one of the cases the affection being found to be the smooth white kidney on *post-mortem* examination, and no examination after death having been made in the other case.

Articular rheumatism was an antecedent disease in six cases. The facts in these cases do not go to show any pathological connection between the rheumatism and the renal affection. In one case, the patient, when admitted, had articular rheumatism. In the other cases an attack of rheumatism had not occurred for a considerable period prior to the manifestations of renal disease, namely, a year in one case, four months in one case, three or four months in one case, ten months in one case, and in one case five years. In all these cases the patients had recovered from the rheumatism before the manifestations of renal disease occurred.

Gout had existed antecedently in three cases. In one of these cases the renal affection was preceded and accompanied by diabetes mellitus. This case is still in progress. In one of the cases the kidneys were found to be fatty after death, and uric acid crystals were observed in the pyramidal bodies. In one only, of the nine cases in which the kidneys were found to be contracted or cirrhotic after death, did gout either precede or accompany the renal disease. The cases under analysis thus furnish very little in support of the propriety of calling the contracted kidney "gouty kidney."

Pulmonary tuberculosis existed antecedently in only two cases. This small proportion, when the frequency of tuberculous disease of the lungs is considered, shows conclusively that this disease does not involve any predisposition to the renal affections under consideration.

Diphtheria was an antecedent disease in two cases. In one of these cases this disease had occurred sixteen months before the occurrence of the renal manifestations which existed at the time the case came under my observation; but the patient had had transient dropsy five years before. In the other case, the diphtheria was associated with scarlatina, and the renal affection was a sequel of the combined diseases.

Valvular lesions of the heart are noted in the previous history of three cases. Two of these cases are among those in which rheumatism occurred.

Sporadic cholera in one case occurred six months before the manifestations of renal disease, which in this case were uræmic coma and convulsions. It is noted in the previous history of three cases that the patients had had syphilis; but in neither of the cases were there present any characteristic syphilitic phenomena when the patients were under my observation.

Diabetes mellitus preceded the renal disease in two cases. As illustrative of disease of the kidneys occurring secondarily to diabetes, these cases possess interest, and an abridgment of the histories is here introduced. In both these cases, at the time of the writing of this report, the patients are living.

Disease of the kidneys occurring as a complication of diabetes mellitus.

CASE I.—Mr. C., aged forty-five, came under my observation in consultation with Dr. R. Hubbard, of Bridgeport, Conn., in August, 1867. He was formerly a merchant in New York, but he had retired from business for the three or four preceding years on account of ill health. On retiring from business and becoming a resident of Bridgeport, he came under the care of Dr. Hubbard, who, finding that the quantity of urine was large, ascertained the existence of diabetes mellitus. The patient refused to adopt a diabetic diet, but continued to eat according to his desire and appetite, taking saccharine and farinaceous substances pretty freely. He did not pursue any course of medication, but occupied himself in building, making alterations in his house, and cultivating his grounds. He was out of doors constantly, and he was accustomed to do much manual labor, becoming, to a considerable extent, an amateur carpenter. During his three years', or more, residence in Bridgeport, up to a few weeks before I saw him, he had enjoyed comfortable health. He gained in weight and strength after leaving New York; he was able to take much active exercise, and considered himself pretty well, passing, however, constantly a considerable quantity of saccharine urine. A few weeks before I saw him, he began to have paroxysms of dysp-

noea at night. Prior to this, for a long time, he was subject to attacks of severe cephalalgia. The paroxysms of dyspnoea were at first infrequent, but at length they recurred every night. In these paroxysms the respiration was labored, and there was the wheezing of asthma. They were relieved by ether and chloroform given by the mouth. In the intervals, respiration was not notably embarrassed. The attacks of cephalalgia were relieved by opium.

About two weeks before I saw him, he was induced to undertake a journey to the White Mountains, by the hope that change of air would be beneficial. He journeyed about forty miles, and found himself so much worse, that he returned home. After commencing his journey, his lower limbs began to swell, and the œdema daily increased. He suffered from a sense of suffocation on lying down, and passed the nights in an easy-chair. The appetite failed, and he became quite feeble. On his return home the urine was examined, and it was found to contain albumen in considerable quantity. It did not now contain sugar, and the quantity was considerably less than usual.

When I saw him, August 2, 1867, his aspect was not morbid; he had good color; the lower limbs were much swollen below the knees, but elsewhere there was no œdema; he had very little appetite; the pulse was frequent and feeble; he felt unable to lie down, but he breathed without labor while sitting or when walking about the room. The urine passed in twenty-four hours was 76 oz., the sp. gr. was 1.010; it was considerably albuminous, and it did not contain sugar. On examination of the chest, there was no evidence of hydrothorax, but subcrepitant râles existed at the base on both sides. The heart was enlarged, without cardiac murmur; and the sounds of the heart were feeble, the second sound being louder than the first over the apex.

At this time albuminuria had succeeded diabetes. Whether the renal affection was tubal nephritis or degenerative disease, was considered as doubtful. The urine was not smoky in appearance, but pale. The microscopical appearances are not noted. Diuretics were given, and afterward tonics. The

dyspnœa was attributed in part to œdema of the lungs, and in part to an asthmatic element.

About three weeks afterward I noted that I had received information of much improvement, the patient going out of doors, eating well, and being able to lie down during the entire night.

Two months afterward, the patient paid me a visit. He then presented quite a healthy aspect. He was able to walk about freely. There was no œdema. The urine, for several weeks, had been free from albumen, and the quantity was not much above that of health. His appetite and digestion were fair. His diet had been restricted, in a great measure, to animal food.

This note was made eighteen months before the time of writing this report. For some time afterward I learned that he continued to have comfortable health; but recently I have been informed that he has general dropsy, and that he is in a very feeble condition.

CASE II.—Mr. P., aged sixty-five, came under my observation, February 18, 1869, in consultation with Dr. William H. Draper. For several years past there has been more or less diuresis, and the urine has been saccharine. In August, 1868, he was suddenly seized with convulsions, which were followed by temporary hemiplegia and aphasia. Three subsequent attacks had occurred, temporary hemiplegia with aphasia following the convulsions in each attack. The last attack was on the day previous to my visit. Dr. Draper had examined the urine repeatedly, and found it to contain always both sugar and albumen. The patient was formerly subject to attacks of gout. He recovered from the last attack of convulsions rapidly, as after the previous attacks; and at the time of writing this report he is sufficiently well to be up and to ride out of doors. The urine in quantity is not much above the average of health; the sp. gr. varies from 1.020 to 1.023; sugar is always present, and also albumen in small quantity. In some specimens a few granular casts have been observed. The heart in this case is unaffected.

These cases are especially interesting, as showing the toler-

ance of renal disease, notwithstanding the previous existence of saccharine diabetes for a long time. In the first of the cases, the recovery of comfortable health, under the circumstances which existed when he came under my observation, is truly remarkable. The question arises, in connection with these cases, whether the diuretic effect of sugar in the blood may not afford more or less security against uræmia.

In one of my cases the patient had ichthyosis extending over the upper and lower extremities and over the body. The urine in this case was abundant (80 oz. in twenty-four hours) and the sp. gr. 1.007. There was considerable dropsy, which nearly disappeared after keeping the bed in hospital for four days without any medicinal treatment. He left the hospital after remaining four days.

THE CONDITION AS REGARDS GENERAL HEALTH PRIOR TO THE MANIFESTATIONS OF RENAL DISEASE.

The facts belonging under this head have an obvious bearing on the etiology. Bright's diseases doubtless involve an internal or constitutional determining cause. Now, does the previous history afford proof of more or less impairment of the general health before the occurrence of events distinctly referable to renal disease? Analyzing the cases with reference to this inquiry, of course those are excluded in which there were antecedent diseases. Excluding these, the notes contain information relating to the inquiry in fifty-three cases. Of these fifty-three cases, in thirty the health was good prior to the manifestations of renal disease. In fourteen of the thirty cases, the event which denoted the existence of renal disease was either œdema or anasarca. In six of the thirty cases, uræmic coma or convulsions occurred either when the patients were supposed to be in good health, or these events were preceded by other ailments for a period not longer than three or four days. Evidence of impaired health prior to the manifestations of renal disease is afforded by the previous history in twenty-three of the fifty-three cases. These facts go to show that, assuming the existence of general or constitutional causes of Bright's diseases, these causes do not, in the majority of cases, give rise to appreciable morbid effects anterior to the

existence of disease of the kidneys. It follows that in the majority of cases the occurrence of Bright's diseases cannot be foreseen, or even suspected, before the obvious manifestations of these diseases take place. These diseases are not peculiar in this respect; the same is true, for example, of pulmonary tuberculosis.

THE SYMPTOMS PRECEDING THE SPECIAL MANIFESTATIONS OF BRIGHT'S DISEASES, NAMELY, DROPSY AND UREMIA.

In the twenty-three cases in which the manifestations of renal disease were preceded, for a greater or less period, by impairment of the general health, the facts noted are as follows:

CASE I.—General debility had existed for several years. A fatal case. No autopsy.

CASE II.—The patient had had a miscarriage, from which she had not recovered; but the period after the miscarriage, before the manifestations of renal disease occurred, and the symptoms denoting impaired health, are not noted. A fatal case. No autopsy.

CASE III.—The patient had been progressively losing weight and strength for a year. A fatal case. No autopsy.

CASE IV.—The same was true in this case. A fatal case. No autopsy.

CASE V.—Indefinite ailments had existed for three weeks, and the patient was ptyalized by mercury. A fatal case. The form of renal disease not now determinable.

CASE VI.—The patient was well up to four weeks before the occurrence of dropsy, but the ailments in these four weeks are not noted. A fatal case, and the kidneys were contracted.

CASE VII.—Cephalalgia and frequent vomiting preceded, but it was not noted for how long a period. A fatal case, and the kidneys were contracted.

CASE VIII.—The menses had been suppressed for a year, no other evidence of ill health being noted. A fatal case, and the kidneys were contracted.

CASE IX.—Cephalalgia and diarrhoea had existed for five weeks. A fatal case, and the kidneys were contracted.

CASE X.—Cephalalgia had existed for six weeks. A fatal case, and the kidneys were not examined after death.

CASE XI.—Cephalalgia and occasional vomiting preceded ; it is not noted for how long a period. A fatal case, and the kidneys were contracted.

CASE XII.—Febrile phenomena preceded for several days. Recovery in this case.

CASE XIII.—General debility, with loss of appetite, and occasional nausea, had existed for two weeks.

CASE XIV.—General debility and loss of appetite had existed for three weeks. Recovery in this case.

CASE XV.—The patient had not been well for some time, but the length of time and the ailments are not noted. Recovery in this case.

CASE XVI.—The patient had never recovered from a confinement with flooding which occurred a year before the manifestations of renal disease. She also had had phlegmasia dolens. Ending in this case not known.

CASE XVII.—The health had been impaired for a month. The ailments are not noted. Ending in this case not known.

CASE XVIII.—The patient was weak, and had pains in different parts of the body for three months. Ending in this case not known.

CASE XIX.—The patient had had cephalalgia, wandering pains, epistaxis, and frequent vomiting for seven months. Ending in this case not known.

CASE XX.—Debility and pain in the loins had existed for three months. Ending in this case not known.

CASE XXI.—Diarrhœa had existed for three months. Ending in this case not known.

CASE XXII.—Cephalalgia had existed, the duration not noted. Ending in this case not known.

CASE XXIII.—Pain in the back had existed for two weeks. Ending in this case not known.

In connection with the points of inquiry in this and the preceding section the following questions arise: Do the different Bright's diseases differ as regards the proportion of cases in which the renal manifestations occur without the evidence of previous impairment of the general health; and, of the symptoms which do precede these manifestations in a certain number of cases, are there any which belong particularly to

either of these diseases? My stock of facts is not sufficient to supply data for answering these questions. I can only state that the cases in which the manifestations of renal disease were, and those which were not, preceded by symptoms denoting impaired health, are distributed among the three groups of cases in my collection, namely, those which proved fatal, those which ended in recovery, and those in which the termination is not noted.

There is an antecedent symptom which I have reserved for a separate notice. I refer to dimness of vision. This symptom is noted as having preceded the manifestations of renal disease in five cases. In one of these cases the patient had consulted Prof. Beard, an eminent oculist, of New Orleans, for this difficulty, and the existence of albuminuria was ascertained by Dr. Beard, renal disease not having been previously suspected. In another case the patient, in like manner, consulted Prof. Henry D. Noyes, of New York, who was the first to ascertain, in the case, the existence of albuminuria. In each of the five cases the dimness of vision was associated with other ailments, namely, in two cases with progressive loss of weight and strength for a year; in three cases with cephalalgia; in one case with diarrhœa, and in one case with diuresis.

What pathological significance have the symptoms which, in certain cases, precede the occurrence of either dropsy or uræmic coma and convulsions? Are they connected with the internal or constitutional causes of the renal disease; or, on the other hand, do they proceed from already existing disease of the kidneys? The latter is the more reasonable as regards antecedent symptoms corresponding with those observed after the occurrence of the special manifestations of renal disease. Reasoning in this way, certain of the previous ailments, namely, cephalalgia, vomiting, diarrhœa, and dimness of vision, are premonitions of the manifestations which are more obvious and distinctive; these ailments are symptomatic of an already existing disease of the kidneys. The practical importance of this point is obvious. Regarding these ailments as premonitions of dropsy and uræmic coma or convulsions, an examination of the urine may be expected to furnish evi-

dence of renal disease in season for measures to be employed to prevent or postpone the occurrence of more serious effects.

The latency of Bright's diseases, in a large proportion of cases, as regards the general health, has been shown by the facts presented in the section preceding the last. It is further shown by cases in which laboring persons continued to work after œdema had occurred. It is noted in the previous history of some cases, that œdema of the limbs and face had been noticed for weeks and even months before the health was sufficiently impaired to oblige the patient to quit work. This remarkable latency is a fact which enforces the importance of examinations of the urine, not only when morbid symptoms are present, or the general health is in any degree impaired, but as a means of interrogating the kidneys even when persons may appear to be perfectly well. If, as is probable, it be true that, in most of Bright's diseases, more is to be effected in the way of preventing further progress of the renal affection than by efforts to save or prolong life after the affection has advanced sufficiently to give rise to dropsy or uræmia, the importance of as early a diagnosis as possible is at once apparent. Doubtless, in many, if not most, of the cases in which the manifestations of renal disease occurred in persons apparently in good health, the urine would have been found for weeks or months, and possibly even for years, to furnish proof that the kidneys were not healthy. A collection of facts bearing on this point is a desideratum.

Assuming that, in certain cases of Bright's diseases, the system tolerates lesions, greater or less in degree, of the kidneys, for an indefinite period, an important inquiry relates to the causes which at length determine the occurrence of the renal manifestations. What are the circumstances which occasion, at a particular time, either dropsy or uræmic coma and convulsions? My cases do not furnish data for a satisfactory answer to this question. In some of the cases the illness was attributed by the patients or their friends to exposure to cold; but it is well known how common it is to refer illness of all kinds to this source on insufficient ground. On the other hand, the previous history in most of the cases gives no account of any exciting causes. Certain it is that, in many, if

not the great majority of cases, the time when the manifestations of the renal disease appear is not determined by any obvious extrinsic exciting causes. In illustration of this fact, and also as examples of the latency of Bright's diseases, I shall subjoin the leading features in a few cases characterized by the sudden occurrence of uræmic coma and convulsions.

Cases illustrative of uræmic coma and convulsions, without obvious exciting causes, and of the latency of Bright's diseases.

CASE I.—Mrs. F., aged twenty-four, having been at a place of amusement the previous evening, and having slept well during the night, awoke apparently well, July 20, 1867. She made no complaint of illness, but at 9 o'clock, A. M., she suddenly became comatose. A quart of urine was soon afterward withdrawn by means of the catheter, and it was found to be highly albuminous, the specific gravity being 1.010. Elixerium was given repeatedly, but it was immediately rejected. She vomited at short intervals. The vapor-bath was also employed. I saw her, in consultation with Drs. Hallett and Gilfillan, of Brooklyn, at 1 A. M., July 21st. She could be roused sufficiently to open the eyes, but she could not be made to speak, nor to protrude the tongue. The respirations were irregular, long intervals occurring, followed by rapid acts of breathing. The pupils were largely dilated. Death took place at half-past two o'clock the following morning. Three years previously, during pregnancy, uræmic coma had occurred, and premature labor was induced by Dr. C. L. Mitchell. At this time she was seen, in consultation, by my colleague, Prof. George T. Elliot. Again, eighteen months previously, in pregnancy, premonitions of uræmic coma had occurred, which disappeared after a spontaneous miscarriage. During the year preceding the fatal attack, examinations of the urine, made from time to time, showed sometimes the presence and sometimes the absence of albumen and casts, the specific gravity being always low. Her general health had been excellent.¹

¹ This case is reported in Prof. Elliot's "Obstetric Clinic," p. 115.

CASE II.—Mr. F., aged fifty-two, was seen by me in consultation with Prof. Fordyce Barker, October 4, 1864. He had been ill for four days with symptoms such as accompany what is commonly called a bilious attack. On the day of my visit the gastric symptoms had mostly ceased, but there was suppression of urine. An hour before my visit, he had seemed more comfortable than at any time during his illness; but, in the mean time, he had become comatose, and he had a slight convulsion during my visit. Elaterium was given without avail, and death took place at one o'clock on the following morning. Prior to this illness he was in fair health, and there were no symptoms pointing to the existence of renal disease.¹

CASE III.—Harris, aged about fifty-five, was admitted into Bellevue Hospital in the summer of 1866, with sporadic cholera. He recovered speedily from this disease, and was employed in the hospital as an orderly man. He appeared to be in perfect health until January 20, 1867, when he had a slight chill, followed by some febrile movement, headache, slight diarrhœa, and general *malaise*. His illness was not sufficient to keep him constantly in bed. The development of typhus fever was suspected. On the 28th he vomited and complained of vertigo. On the next day he showed some delirium. On the 31st he was seized with convulsions, which recurred at short intervals, and in the intervals he was comatose. Death took place on this date. On the morning of the day of his death, disease of the kidneys being now for the first time suspected, the urine was found to be highly albuminous, and to contain granular casts.

CASE IV.—The following account of this case is based on a record made by Dr. O. C. Sparrow, formerly clinical assistant at the Long Island College Hospital:

Mr. G., aged forty-nine, coppersmith, had been subject for some years to gouty attacks, and for several weeks preceding his present illness he had complained of a constant sense of

¹ This case is given in my work on Practice, 3d edition, p. 768. For another case in which sudden coma, followed by convulsions, occurred, the patient being apparently in good health, and renal disease not having been previously suspected, see *ibid.*, same page. This case is included among those under analysis.

fatigue. The skin was sallow. He had at times spoken of slight pain in the head, and of dull pain in the loins. There was no dropsy. The urine, examined repeatedly, was always found to be free from albumen. The quantity of urine was habitually large. The appetite and digestion were fair.

This is the history prior to June 18, 1867. Up to this date he attended to his business; but, in addition to the symptoms noted above, he had occasionally vomited. On the date just named, vomiting became an urgent symptom. The stomach was intolerant of the blandest fluids; even a teaspoonful of rice-water was immediately rejected. He had no pain nor febrile movement. The vomiting persisted in spite of various remedies. A watery liquid, of almost inky blackness, was vomited, in considerable quantity, with very little nausea. The urine, again examined, was found not to contain albumen. The following day the vomiting ceased, apparently having been arrested by suppositories of morphia. The pulse became frequent and feeble; the pupils were moderately contracted; there was a kind of mirthful delirium, with subsultus, and at length some general convulsive movements. Stupor and coma supervened, and death took place on June 21st, the fourth day from the occurrence of vomiting and the suspension of his work.

On examination, after death, the kidneys were found to be much contracted, the weight of both being five ounces. The heart was hypertrophied, the weight being nineteen ounces, and the valves were sound. The liver presented the appearance of incipient cirrhosis. All the arteries examined were atheromatous, especially those of the brain. There was no evidence of meningitis. The urine withdrawn from the bladder, after death, contained a moderate amount of albumen and an abundance of tubular casts.

The state of pregnancy appears, in certain cases, to exert an agency in the causation of Bright's diseases. The facts gathered from my notes in relation to this point are as follows: In two cases, dropsy commenced during pregnancy, and in both these cases miscarriage took place. An account of one of these cases has been given among the cases illustrative of recovery. In one case dropsy began two months after con-

finement. The patient attributed it to taking a cold bath at night, and sleeping without a night-dress. (Edema of the face and lower limbs was first noticed the following morning. In one case, an account of which is given in illustration of the occurrence of sudden coma without premonitions or exciting causes, the first manifestation of renal disease had occurred two years before, while the patient was pregnant, and premature delivery was induced. In one case, the manifestations of renal disease followed a miscarriage. In another case, scarlatina occurred shortly after confinement, and the renal disease was developed as a sequel of the scarlatina. Finally, in one case, the patient stated that she had not been well since her confinement, which was accompanied by flooding, but dropsy did not manifest itself until a year afterward.

4.—SYMPTOMS AND COMPLICATIONS.

As already stated, my records are not sufficiently comprehensive and complete to furnish data for determining, with numerical exactitude, the proportion of cases in which different symptoms and complications were present or absent. The objects of the analysis under this heading will be to examine the histories with reference to the facts which were noted, selecting those which appear to be worthy of being presented, and offering remarks which the facts may suggest. I will interrogate the cases with reference, *first*, to the urine, and *second*, to dropsy; afterward with reference to symptoms and complications relating respectively to the digestive, the nervous, the respiratory, and the circulatory system.

Urine.—Information concerning the urine is noted in 91 cases. In all but 3 of these 91 cases the urine contained more or less albumen. The albumen is stated to have been large or abundant in 55 cases. It was either moderate or small in 8 cases. In 25 cases the presence of albumen is noted without any statements regarding quantity. The small number of exceptions to the rule that albuminuria exists in Bright's diseases is a noteworthy fact. It is not uncommon to hear the opinion expressed that albumen is not very unfrequently absent. Especially in cases of the lesion known as the contracted or cir-

rhoe kidney, albuminuria is supposed by some to be frequently wanting. Examining the cases in which this lesion was found after death, in 8 the histories contain information on this point. Of these cases, in 6 the urine was albuminous. The quantity of albumen was considerable in 4 of these 6 cases; it was moderate in one case, and only the fact of albuminuria is stated in one case. In 2 cases the urine was not albuminous. In one of these 2 cases, however, although repeatedly before death the urine had been examined for albumen with a negative result, the urine withdrawn from the bladder after death was found to be albuminous, and to contain casts. In the other case a single examination only of the urine was made. In the third of the 3 cases in which there was no albuminuria, the kidneys were found to be waxy after death. The urine was repeatedly examined in this case. Albuminuria thus existed in all the cases in which lesions other than the contracted and the waxy form of disease were found after death; in all the cases ending fatally in which *post-mortem* examinations were not made; in all the cases the termination of which was not noted, and in all the cases which recovered.

The presence or absence of tubular casts was noted in 29 cases. Of these cases, casts were present in 25, and absent in 4 cases. In the remainder of the cases, either the urine was not examined microscopically, or nothing was noted in relation to casts. As regards the different kinds of casts, in 7 cases, epithelial casts were observed; in 9 cases, granular casts; in 15 cases, hyaline or waxy casts; in 5 cases, fatty casts, and in a single case the casts were bloody. Blood-corpuscles in the sediment of the urine were noted in 3 cases. The study of the urine, as regards casts, is of interest and importance in relation to several points of inquiry, among which are the following: their occurrence in the small number of cases of Bright's diseases in which albumen in the urine is not present; their significance as denoting different forms of renal disease, the extent of lesions, and the condition of the tubules with respect to epithelium; their relations to different symptoms and events in cases of Bright's diseases, and their occurrence in the course of various diseases in which the kidneys may be only tran-

siently affected. An analysis, with reference to these and other points of inquiry, of a large number of cases, in which microscopical examinations of the urine were made daily or frequently, is a desideratum which must be left to the eyes and hands of others.

The quantity of urine passed in twenty-four hours was noted in only a very few cases. In fact, the records contain information concerning quantity in only 20 cases. In 12 of these 20 cases the quantity is stated to have been more or less below the minimum of health. In 3 cases suppression occurred. In 4 cases the quantity was more or less above the maximum of health, exclusive of two cases in which diabetes mellitus existed. The quantity in twenty-four hours in one of these cases was 61 ounces; in another case 5 pints, and in an other case 69 ounces, the specific quantity in each of these cases being low. In one case of scanty urine the quantity in twenty-four hours at one time was only two ounces. Death occurred in each of the cases in which there was suppression, the suppression continuing until death. In two of these cases the patients died in uræmic coma; in the other case, it is noted that the death occurred suddenly, having been preceded by delirium and great jactitation. In the case in which the quantity of urine is noted to have diminished to two ounces in the twenty-four hours, profound coma occurred, but the case ended in recovery. The specific gravity of the urine whenever noted (10 cases) was, with a single exception, always below that of health, varying from 1.007 to 1.013. In the single excepted case it was 1.027. These cases are exclusive of those in which diabetes mellitus existed.

In three cases the quantity of urine in twenty-four hours and the specific gravity were noted for a series of days, in order to observe the effect of diuretic remedies. The details in these three cases are as follows:

CASE I.—In this case, the termination was not known. The patient was discharged from hospital much improved, general dropsy having nearly disappeared; but the urine was still albuminous.

On the day after the date of his admission, the quantity of urine was 48 ounces, and the sp. gr. 1.010. Under the use of

squill and digitalis, with the infusion of juniper-berries, during the following eight days, the quantity varied from 52 oz. to 79 oz., and the sp. gr. remained constantly at 1.010. December 6th, half an ounce of the nitrate of potassa was substituted for the squill, digitalis, and juniper. Under this remedy the quantity varied from 56 oz. to 97 oz., and the sp. gr. from 1.010 to 1.012.

CASE II.—This case ended fatally, and the anatomical characters were those of the smooth, white kidney. There was considerable anasarca, and the urine contained albumen in abundance. The mode of dying was by asthenia.

The quantity of urine and sp. gr. for two successive days, shortly after admission into the hospital, the patient taking no remedies, but the hot-air bath being employed at night, were, the first day, 22 oz., sp. gr. 1.015; the second day, 22 oz., sp. gr. 1.012. The next day but one vomiting and diarrhoea occurred. On this day the quantity was 18 oz., and the sp. gr. 1.008. Commencing four days afterward, the quantity and sp. gr. were ascertained for 11 successive days, no treatment being pursued. The quantity varied from 12 to 51 oz., and the sp. gr. from 1.008 to 1.014. Then for four days, the patient taking the iodide of potassium, the quantity varied from 14 to 23 oz., and the sp. gr. from 1.010 to 1.028.

CASE III.—This case ended fatally, and the anatomical characters were those of the smooth white kidney. The urine was albuminous, and there was considerable anasarca. The mode of dying was by asthenia.

Shortly after admission the quantity of urine on one day was 20 oz., and the sp. gr. 1.015; and on the following day the quantity was 24 oz., the sp. gr. 1.015.

Under treatment by the external application of squill, iodine, and digitalis, the urine, on five days, varied in quantity from 14 to 40 oz., and the sp. gr. from 1.015 to 1.030. Next, under the use of quinia and iron, the urine, on ten successive days, varied in quantity from 10 to 28 oz., and the sp. gr. from 1.015 to 1.025. The nitrate of potassa was then given for three days, and the quantity varied from 14 to 16 oz., and the sp. gr. from 1.015 to 1.020. The treatment then being changed to the quinia and iron for three days, the quantity varied from

1.014 to 1.016, and the sp. gr. remained 1.015. External diuretics being again tried for four days, the quantity varied from 9 to 14 oz., and the sp. gr. from 1.018 to 1.020.

These observations are too few to warrant any deductions. So far as they go, they do not show much effect from diuretic remedies. I introduce them chiefly as suggestive of a direction in which clinical researches may be prosecuted with advantage. An extended series of recorded cases, embracing daily examinations of the urine with regard, not alone to quantity and the sp. gr., but the results of quantitative analyses, by furnishing data for showing the relations between different abnormal conditions of the urine and the important events which enter into the clinical history of Bright's diseases, the effect of different diuretics, the circumstances which affect the operation of these and other remedies, etc., would, doubtless, prove of no small practical value.

Dropsy.—Of 89 cases in which either the existence or absence of dropsy is noted, it existed in 74, and it was absent in 15 cases. The dropsy was either slight or moderate in 21 cases. In a few of these cases it consisted only of œdema of the lower limbs, or of the face. The dropsy was considerable in 36 cases, there being in these cases more or less anasarca and effusion into serous cavities. The degree and extent of the dropsy are not noted in 17 cases.

The relations of dropsy to other symptomatic events in Bright's diseases constitute an interesting field of inquiry. I shall consider here only the relations between dropsy and albuminuria.

Of the 15 cases in which there was no dropsy, in one case there was no albumen found in the urine during life, but the urine withdrawn from the bladder after death was found to be albuminous. In another case the urine was found, on a single examination, to be free from albumen. In another case there was suppression, and the urine had not previously been examined. In all the other cases (12) the urine was more or less albuminous. In 3 cases simply the fact of albuminous urine is noted, the quantity of albumen not being stated. In one case the quantity was moderate, and in another case there was only a trace of albumen. In 7 cases the quantity of albumen in

the urine was either considerable or large. It follows, from these results of the analysis, that, in the cases in which Bright's diseases are unattended by dropsy, the urine, as a rule, is more or less albuminous; and that, in a proportion of at least one-half of such cases, albumen is abundantly present in the urine.

Of the 21 cases in which the dropsy was slight or moderate, in one case there is no information concerning the urine. In all the remaining 20 cases the urine was more or less albuminous. The fact only of albuminous urine is noted in 8 cases, the quantity not being stated. In 7 cases the quantity of albumen was considerable or large; in 3 cases it was moderate; in 2 cases it was small, in one of the latter a trace only being observed. These results go to show that in at least one-third of the cases in which the dropsy accompanying Bright's diseases is small or moderate, albumen exists in the urine in either considerable or large quantities. They go to show that, with a small or moderate amount of dropsy, the urine is always albuminous.

Of the 36 cases in which the dropsy was considerable or great, in 5 it is simply noted that the urine was albuminous, and in 2 information concerning the urine is wanting. In the remaining 29 cases the quantity of albumen in the urine is noted as moderate in only one case, and in no case is it noted as slight. It is noted as either considerable or large in 28 cases. These results show a very striking correspondence of a considerable or a large amount of dropsy with a considerable or large amount of albumen in the urine. Either the former is dependent on the latter, or *vice versa*; or, again, both the dropsy and albuminuria, in these cases, are dependent on a common cause. Bringing pathological reasoning to bear on this point, the first of these inferences is the most rational.

Of the 17 cases in which the degree and extent of dropsy are not noted, in one case information concerning the urine is wanting. In all the other cases the urine was albuminous. In 10 cases the quantity of albumen was large, and in 6 cases the quantity was not noted.

With reference to the relations between dropsy and albuminuria, it is to be borne in mind that, in Bright's diseases, the urine is more or less albuminous save in a very small pro-

portion of cases, the proportion, in this analysis, being 88 of 91 cases. Of the 3 of 91 cases in which the urine did not contain albumen, dropsy was also wanting in 2 cases, and in the remaining case the history is deficient in information concerning dropsy. In as far, therefore, as the results of this analysis go, dropsy is wanting in the cases in which the urine is free from albumen.

Interrogating, the cases in which, on *post-mortem* examination, the kidneys were found to be contracted or cirrhotic, in 8 the histories contain information concerning dropsy. Dropsy existed in each of these 8 cases. The dropsy was slight, and consisted only of œdema of the face in 3 cases; it was considerable in 4 cases, and the fact only of anasarca is noted in 1 case. In 6 cases in which fatty kidneys were found after death, dropsy was wanting in 1 case; it was considerable in 4 cases, and in 1 case simply the existence of anasarca is noted.

Hydroperitonæum, in a degree notably disproportionate to the dropsical effusion in other situations, was noted in 7 cases. In 2 of these cases tapping was resorted to, this operation in one of the cases being employed twice; all these cases but one ended fatally under my observation, the patient, in the excepted case, being discharged from hospital much improved, especially as regards the general dropsy, but the hydroperitonæum continuing. In all the cases the patients had been spirit-drinkers. Five of the cases were in the group of cases in which *post-mortem* examinations are noted; and in all these cases the liver was found to be contracted.

Symptoms and Complications referable to the Digestive System.

Vomiting and diarrhœa, separately or together, are the most important of the symptoms in Bright's diseases, referable to the digestive system; I shall limit my analysis chiefly to these symptoms. The cases which were not under my observation until their termination either in death or recovery, I do not embrace among those analyzed. The number of cases interrogated, therefore, is 76. Of these cases, in 34, the records do not contain definite information respecting either the presence or absence of vomiting or diarrhœa. The

probability is, that in these cases, neither vomiting nor diarrhœa occurred; or, at all events, they were not prominent symptoms. In 40 cases, the notes enable me to determine either that one or both of these symptoms were present, or that they did not exist in any notable degree. Of these 40 cases, vomiting alone was a symptom more or less prominent in 14; diarrhœa occurred alone in 4; and both vomiting and diarrhœa existed in 10 cases. Neither vomiting nor diarrhœa was present in 10 cases. Thus, in 28 of the 40 cases, vomiting or diarrhœa, or both, occurred, being more or less prominent and persisting.

Of these 40 cases, 31 ended fatally, and 9 ended in recovery. Analyzing these two groups of cases separately, the results are as follows: of the 31 fatal cases, vomiting alone was more or less prominent in 12; diarrhœa alone was more or less prominent in 3; and both vomiting and diarrhœa were more or less prominent in 10 cases. In 6 cases neither of these symptoms existed in any notable degree. Of the 9 cases which ended in recovery, vomiting alone was more or less prominent in 2 cases; diarrhœa alone was more or less prominent in 1 case, and vomiting and diarrhœa together were not prominent in a single case. In 6 of the 9 cases neither existed in any notable degree.

It is thus seen that there is a striking contrast between the cases ending fatally, and those ending in recovery, as regards the occurrence of these symptoms; and, so far as these cases go, they show that vomiting and diarrhœa, separately or together, are symptoms which are more likely to occur in connection with cases which end fatally than with those which end in recovery.

What relations have these symptoms with the occurrence of uræmic phenomena, meaning by this phrase now, as hitherto, coma and convulsions? The facts bearing on this question are as follows: Of the 12 fatal cases in which vomiting alone was prominent, either coma or convulsions, or both, occurred in 10, and were wanting in 2 cases. Of the 3 fatal cases in which diarrhœa alone was prominent, coma and convulsions did not occur in 2 cases, and in one case, death was preceded by semi-coma and delirium. Of the 10 fatal cases in

which both vomiting and diarrhœa were prominent, coma or convulsions, or both, occurred in 3, and were wanting in 7 cases. Of the 6 cases in which neither vomiting nor diarrhœa was prominent, coma or convulsions, or both, occurred in all, save one case. It would appear from these figures, that in fatal cases, coma and convulsions are more likely to take place when vomiting occurs alone than when it is associated with diarrhœa, or when the latter occurs alone; and that coma and convulsions are as likely to take place in cases without either vomiting or diarrhœa as in cases in which vomiting alone is a prominent symptom.

Of the 2 cases ending in recovery, in which vomiting was a prominent symptom, uræmic phenomena occurred in one and not in the other case. In the single case in which diarrhœa was prominent, there were no uræmic phenomena; and in the six cases in which neither vomiting nor diarrhœa was prominent, uræmic phenomena occurred in only a single case. Contrasting the two groups of cases as regards the relations between vomiting or diarrhœa, or both, and uræmic phenomena, the inference is, that the pathological conditions of the kidneys in cases which recover involve a lesser degree of liability, alike to these symptoms referable to the digestive system, and to coma and convulsions. Moreover, inasmuch as, in the group of fatal cases, both uræmic phenomena and the vomiting and diarrhœa are of much more frequent occurrence than in the cases which recover, it is, perhaps, fair to infer that the explanation of the latter symptoms which is generally held is corroborated, namely, that they are due to the elimination of urea through the alimentary canal, and are, therefore, among the effects of uræmia. The occurrence of coma and convulsions less frequently in the cases in which diarrhœa is a prominent symptom, than in the cases in which vomiting is prominent, or the cases in which neither vomiting nor diarrhœa is prominent, favors the belief that the diarrhœa is to a certain extent conservative. The bearing of this on practice is obvious.

As regards complications affecting the digestive organs, cirrhosis of the liver was denoted, as already stated, under the heading Dropsy, by a disproportionate amount of effusion into the peritoneal cavity. In 5 of these cases the existence

of cirrhosis of the liver was ascertained by examinations after death. Hæmorrhoids with considerable hæmorrhage is noted in one case. Fissures of the anus with hæmorrhage is noted in one case.

Peritonitis was developed in one case, after the patient, a male, had been in hospital several months. Death took place on the day following. The fact that this was the only case in which this complication was determined by the diagnostic symptoms, coupled with the fact that in none of the cases, in which the notes embrace the appearances after death, was there evidence of peritoneal inflammation, goes to show that peritonitis occurs very unfrequently in the course of Bright's diseases. I may mention in this connection that I have seen in one case, in hospital practice, peritonitis developed after the operation of tapping. Of this case I made no notes.

Symptoms and Complications referable to the Nervous System.

The more important of the symptoms referable to the nervous system, which are observed in cases of Bright's diseases, are coma and convulsions, occurring separately or together, delirium, cephalalgia, and impairment or loss of vision. Considering first coma and convulsions, and analyzing only the cases which ended either fatally or in recovery, the number, after rejecting six cases in which the histories do not warrant any conclusion as to the presence or absence of these events, is 70. Of these 70 cases, coma without convulsions is noted in 13 cases. Convulsions without coma is noted in 4 cases. Convulsions and coma are noted in 9 cases. The proportion of cases, thus, in which these uræmic events occurred, separately or together, is 26 in 70 cases.

The relations of these uræmic events to the termination in either death or recovery is the first point of inquiry which suggests itself. Of the 13 cases in which coma occurred without convulsions, in 12 the cases ended fatally, one case only ending in recovery. Of the 4 cases in which convulsions without coma occurred, all ended fatally. Of the 9 cases in which coma and convulsions occurred, all ended fatally. Thus, of the 26 cases in which these uræmic events occurred, separately

or together, 25 were fatal. These results show the significance of these events as regards prognosis.

The relations of these events to dropsy is another point of inquiry. Of the 13 cases of coma without convulsions, in 2 the notes are defective as regards dropsy. Anasarca existed in 8 of the remaining 11 cases. The anasarca was either considerable or great in 5, and slight or moderate in 3 of these 11 cases. There was no dropsy in 3 of the 11 cases. Of the 4 cases in which convulsions occurred without coma, dropsy existed in all, being considerable or great in 2 cases, slight in one case, and in one case the amount is not stated. Of the 9 cases in which coma and convulsions occurred, anasarca existed, the amount not stated, in one case, and there was no dropsy in 8 cases. Thus; of the 26 cases in which these uræmic events occurred, separately or together, there was no dropsy in 11 cases; considerable or great anasarca existed in 7 cases, and slight or moderate anasarca in 4 cases; the amount of the anasarca is not stated in 3 cases, and in 1 case it is not stated whether dropsy did or did not exist.

Referring back to the section of this report in which dropsy is considered, it will be seen that in only 15 of 89 cases in which the notes contain information on this point was dropsy wanting. In 11 of these 15 cases, as just seen, either coma or convulsions, or both, occurred. Now, of the remaining 4 cases in which dropsy was wanting, 2 cases are among those, the ending of which is unknown, and these two cases are not included in the groups just analyzed. In each of these 2 cases coma and convulsions occurred; so that uræmic coma or convulsions, or both, occurred in 12 of the 15 cases in which dropsy was wanting. The conclusions are, that, of the cases of Bright's diseases in which the uræmic events now under consideration occur, dropsy is wanting in a proportion not much under one-half, and that these events occur in the vast majority of the cases of Bright's diseases in which dropsy is wanting. Again, absence of dropsy characterizes a much larger proportion of the cases in which coma and convulsions occur together, than of the cases in which either coma or convulsions occur separately.

Delirium is noted in 7 of the 70 cases. In three cases only

is the kind or degree of the delirium noted. In one of these 3 cases it is stated to have been passive, and in another case muttering. In one case it was very active, the patient shouting and requiring restraint. In this case convulsions occurred, and the active delirium followed the convulsions. Convulsions occurred in another case. Coma without convulsions occurred in one case; and in four cases neither coma nor convulsions occurred. It is thus seen that delirium, except, perhaps, in so slight a degree as not to be considered noteworthy, is not a frequent, and is very rarely a prominent symptom in Bright's diseases.

Cephalalgia.—Pain in the head is noted in 7 of the cases ending either fatally or in recovery, and in 2 of the cases of which the termination is not known, making, in all, 9 cases. It is very probable that these were not the only cases in which this symptom existed, for, if not prominent and persistent, it would not be likely to be noted. In the 9 cases in which it is stated to have existed, it was a notable feature. Reference is now had to this symptom as existing while the cases were under observation, not as entering into the previous history.

The chief point of interest relating to this symptom is its significance as shown by its association with other symptoms referable to the nervous system. The facts concerning this point are as follows: In 3 of the cases in which cephalalgia was a notable feature coma occurred. In 4 cases it was associated with impairment of vision, the impairment in two of these cases existing only when the pain in the head was intense. Tinnitus aurium was a prominent symptom associated in one case. In 3 cases there were no other symptoms of importance referable to the nervous system. Its presence, thus, in one-third of the cases in which coma occurred, and its association with impaired vision in nearly one-half of the cases in which it was noted, go to show the uræmic character of the symptom. As regards the bearing of the symptom on prognosis, it was present in precisely the same number of cases ending fatally and of those ending in recovery, namely, in 4 cases of each group; as, however, the fatal cases analyzed are twice as many as the cases ending in recovery, the inference from the results of this analysis is, that it occurs oftener in

cases in which recovery takes place than in those which end fatally.

Impairment and Loss of Vision.—The vision was more or less affected in 9 cases of those ending either fatally or in recovery, and in 4 cases of those the termination of which is not known, in all, 13 cases. The affection consisted in more or less mistiness of vision in 11 cases. In 2 cases there was complete loss of vision. Of the latter cases, in one the amaurosis was of brief duration, the sight being completely restored in six days. During these six days the patient had convulsions, and a portion of the time was in coma. In the other case the amaurosis had existed seven days before the admission of the patient into hospital, and it continued when the patient was discharged, his stay in hospital having been fourteen days. Cephalalgia was a notable symptom in the latter case, but coma or convulsions did not occur. Of the 11 cases in which vision was not lost, but more or less impaired, the degree of impairment varied in the different cases between slight and considerable mistiness. In 4 of these cases coma occurred. Convulsions occurred in one case, coma not being noted in that case. Cephalalgia was a notable feature in two cases, in neither of which did coma or convulsions occur. Tinnitus aurium was associated in one case. In 2 cases the notes are not complete enough to say that no other symptoms referable to the nervous system occurred; but this fact is distinctly noted in 2 cases. *Musæ volitantes* were associated in one case.

As regards the persistence of the affection of vision, aside from the case in which restoration from complete blindness took place in six days, it is noted in 2 cases that the impairment was temporary, and in 2 cases vision was nearly, but not completely, restored.

Of the cases in which neither loss nor impairment of vision is noted, 7 are among those which ended fatally, and 4 are among those ending in recovery. In the cases in which there was total blindness for six days, recovery took place. In 3 of the cases ending fatally, the autopsy showed contracted kidneys in one case, and fatty kidneys in 2 cases.

The occurrence of either coma, convulsions, or cephalalgia,

in all the cases, save two, in which the histories contain information concerning other symptoms referable to the nervous system, is a fact which may be considered as showing the uræmic character of the affection of vision. As a symptom, however, its bearing on the prognosis is not unfavorable, since it occurred in the proportion of 7 in 49 of the fatal cases, and 4 in 21 of the cases ending in recovery.

Hemiplegia existed in 4 cases. In one of these cases it is simply stated that slight hemiplegia existed when the patient was admitted into hospital. Aortic lesions and enlargement of the heart existed in this case, and embolism may be suspected. In one case slight hemiplegia had existed for nine years, and it evidently had no connection with the renal disease. In one case, an account of which has been given in this report, transient hemiplegia of the right side and aphasia occurred repeatedly in connection with attacks of epileptiform convulsions, diabetes mellitus existing in this case. In the fourth case, the hemiplegia and the renal affection followed scarlatina combined with diphtheria. The patient recovered completely from the hemiplegia as well as from the renal affection, and the paralysis was doubtless a sequel of the diphtheria. These facts, thus, do not go to show any special connection between the renal affection and the hemiplegia in the few cases in which the latter occurs.

In view of the occurrence of cephalalgia, coma, and convulsions, in a certain proportion of cases, the inquiry arises, whether these symptoms may not denote the development of meningitis as a complication. In none of my cases is it noted that, preceding or accompanying any of these symptoms, there were others which pointed to inflammation within the cranium. Hence, it is fair to conclude that meningitis may be excluded, at least acute meningitis. Of the fatal cases in which autopsies were made, the head was examined in four only. In one of these cases the brain was congested, and the amount of subarachnoid effusion was rather large, but there was no exudation of lymph. In this case convulsions occurred, and in one of the convulsive attacks death took place. In another case the subarachnoid effusion was moderate, and it was slightly turbid. This patient was brought into hospital in a

state of coma, and died soon after admission, the previous history being unknown. In the third case, it is noted that there were no abnormal appearances within the skull. The vision was affected in this case, but coma or convulsions did not occur. In the fourth case the brain was congested, with no other morbid appearances. Coma and convulsions existed in this case.

Symptoms and Complications referable to the Respiratory System.

The analysis under this heading will relate chiefly to the occurrence of certain complications, namely, pleurisy, pneumonia, pulmonary œdema, bronchitis, pulmonary tuberculosis, and œdema of the glottis. With reference to these complications, I will arrange the cases into the following groups: 1. Fatal cases with autopsies; 2. Fatal cases in which *post-mortem* examinations were not made; 3. Cases, the ending of which is not known; and, 4. Cases ending in recovery.

Of the fatal cases with autopsies (36), in 2 cases the lungs were not examined; in 16 cases the condition of the lungs is not noted, and in 8 cases it is stated that the lungs were healthy. In 2 cases pleurisy existed. The effusion of liquid in one of these cases was very large, and thoracentesis was resorted to. Recent lymph in this case existed on the other side without liquid effusion. Pericarditis also existed in this case. In the other case it is simply noted that recent pleurisy existed on the left side; and the lung on this side was tuberculous. Pneumonia is noted in but one of the cases in this group. The upper lobe of the right lung was in the first stage of pneumonia. Emphysema existed in this case. There was also much hydrothorax, and there were aortic lesions. Pulmonary œdema is noted in 3 cases, as found after death; and in one case it was denoted by signs, but the lungs were not examined after death. The existence of bronchitis is not noted in any of the cases in this group. Emphysema is noted in 3 cases. Pulmonary tuberculosis existed in 2 cases, in one case the lesions consisting of small tuberculous cavities, and in the other case two collections of yellow and partially-softened tubercle were found in one lung. Cal-

careous deposits were found in the lungs in one case. In 2 cases œdema of the glottis occurred. In one of these cases laryngotomy was performed, after which there was no obstruction of breathing, but the patient became comatose, and died on the following day. In the other case the obstruction to breathing caused by the œdema was the immediate cause of death. The renal affection in one of these two cases was cystic destruction of one kidney, the other being fatty; and in the other case, both kidneys were fatty.

In 2 cases irregularity of respiration is noted; in one case the irregularity was characterized by considerable intervals between the respiratory acts; in the other case the respirations at times becoming much accelerated, and this occurring especially just before the occurrence of convulsions. It is altogether probable that disturbance of the rhythm of respiration occurred in cases without having been noted.

Of the fatal cases in which *post-mortem* examinations were not made (20), the lungs were free from disease, as determined by symptoms and signs, in 17 cases. Bronchitis existed in one case. In one case tuberculous disease existed. In this case the patient had had cough and expectoration for several years, the tuberculous disease doubtless being antecedent to the renal affection. In one case the history is defective as regards the presence or absence of pulmonary disease.

Of the cases the ending of which is unknown (25), in one case the history is defective with reference to pulmonary disease. In 15 cases there were not present symptoms or signs denoting any important pulmonary disease. In one case pneumonia occurred, the lower lobe of the right lung being affected, the patient recovering from this affection. In another case chronic pleurisy occurred, the left side of the chest becoming filled with liquid effusion. The patient recovered from this affection. In 6 cases there existed cough and expectoration with either moist or dry bronchial râles, without signs denoting any other affection than bronchitis.

Of the cases ending in recovery (22), in 3 the amount of hydrothorax occasioned notable embarrassment in breathing, and inability to lie down. An account of two of these cases has been introduced, with those illustrative of recovery

from the renal affection. In these 3 cases there were no symptoms nor signs denoting disease of the lungs. In 15 of the remaining cases there were no symptoms nor signs of pulmonary disease. In 2 cases the histories are defective with respect to disease of the lungs. In one case the symptoms denoted pulmonary œdema; and in one case there was bronchitis.

Deducting, from the whole number of cases analyzed (102), those in which information concerning the existence or absence of disease of the lungs is wanting, the number remaining is 80 cases. Of these 80 cases, in 58 there was no important disease of lungs. Pleurisy is noted in 32 cases; pneumonia in 2 cases; pulmonary œdema in 5 cases; tuberculous disease in 4 cases; bronchitis in 8 cases; and œdema of the glottis in 2 cases.

Of these several pulmonary affections, all, excepting the tuberculous cases and perhaps some cases of bronchitis, were secondary to the renal disease, and therefore they were, properly speaking, complications. Considering the small number of cases of pulmonary tuberculosis (5), and the fact that in most, if not all, of these few cases the tuberculous was antecedent to the renal disease, it is a warrantable conclusion that Bright's diseases involve no tendency whatever to a tuberculous affection of the lungs, nor, on the other hand, are tuberculous patients prone to Bright's diseases. Moreover, making due allowance for the fact that patients affected with Bright's diseases are not exempt from the operation of causes other than those originating in the kidneys, which produce pleurisy, pneumonia, and bronchitis, the tendency to the latter affections, as complications, is by no means strong.

Pulmonary œdema in no cases in this collection, save perhaps in two, existed sufficiently to involve great disturbance of respiration. I have, however, repeatedly observed its occurrence, especially when mitral cardiac lesions coexisted, and sometimes in a degree to occasion immediate danger to life. Œdema of the glottis, although occurring in only two cases, is so rare in its occurrence in other pathological connections, that the renal diseases are to be considered as standing in a special

causative relation to it, especially when it occurs without being preceded or accompanied by either laryngitis or pharyngitis.

Symptoms and Complications referable to the Circulatory System.

The important points of inquiry in this section of the report relate to affections of the heart. The cases ending fatally, in which examinations after death were made, have been already analyzed with reference to enlargement of the heart without valvular lesions, to valvular lesions, and to pericarditis. For the results of this analysis the reader is referred to the section treating of the lesions found after death in other organs than the kidneys. It remains to analyze, with reference to cardiac affections, as denoted by physical signs, the fatal cases without autopsies, the group of cases the ending of which was not ascertained, and the cases ending in recovery.

Of the fatal cases without autopsies (20), it is noted in 9 that there were no signs of disease of the heart. In 6 cases the notes are deficient in information, either positive or negative, with reference to cardiac disease. In 5 cases cardiac affections existed. The affections in these 5 cases were as follows: In 2 cases there was enlargement of the heart, without any murmur denoting valvular lesions. In 2 cases there was enlargement with murmur denoting valvular lesions. In one of these cases the murmur was a mitral systolic murmur, without the evidence of insufficiency of the mitral valve (an intra-ventricular murmur). In the other case, examinations made prior to the occurrence of uræmic coma and convulsions were negative as regards cardiac murmur; but, during febrile movement which followed an attack of uræmic coma and convulsions, a systolic murmur was heard at the base of the heart. In one case pericarditis occurred two days before death, as denoted by pericardial pain and a friction murmur.

In one case in which the absence of the signs of cardiac disease is noted, the action of the heart, shortly before the occurrence of uræmic convulsions during which death took place, was notably slow and irregular, the pulse being only thirty-two per minute. This was not an idiosyncrasy, but it was incident to the renal disease

Of the cases the ending of which is not known (25), in 17 there were no signs of disease of the heart up to the time when the patients passed from under my observation; and in 5 cases the notes are defective. Cardiac affections existed in 3 cases. In one case enlargement of the heart existed without valvular murmur. In one case there were enlargement and a mitral regurgitant murmur. In one case a mitral systolic murmur existed without enlargement. In no case in this group was pericarditis noted.

Of the cases ending in recovery (22), in 17 there were no signs of disease of the heart, and in 3 cases nothing is noted in relation to cardiac disease. In one case a mitral systolic and an aortic direct murmur existed without enlargement of the heart; and in one case a mitral systolic murmur, without regurgitation (an intra-ventricular murmur), existed, also without enlargement of the heart.

In one case in the last group the pulse was noted to be, for a time, sixty per minute and intermittent, no cardiac disease existing in this case.

In one of the cases ending in recovery, pericarditis had occurred prior to the case coming under my observation, and when under my observation the evidences of pericardial adhesions were made out. The recovery from pericarditis, in this case, is a noteworthy fact.

Striking out from these three groups the cases in which nothing is noted respecting the existence or absence of disease of the heart, the number of the cases remaining is 53. Of these 53 cases, in 10 cardiac affections existed. Of these 10 cases, in 4 the heart was enlarged without valvular lesions; in 2 enlargement was associated with valvular lesions; in 3 valvular lesions existed without enlargement, and in one case pericarditis occurred.

Comparing these results with those obtained by an analysis of the fatal cases with autopsies (see section devoted to "Morbid Appearances after Death"), a striking disparity is observed as regards the proportion of cases in which the existence of cardiac affections is noted. This disparity is to be accounted for as follows: Of the cases the ending of which is not known, in a certain proportion, affections of the heart, which did not

exist when the patients were under observation, may have been subsequently developed. Of the fatal cases without autopsies, in a certain proportion the patients passed from under my observation before death took place. Of cases ending in recovery, it is not to be expected that cardiac complications will be often found. Finally, I am quite willing to admit that, in some cases, a certain amount of enlargement, which would be apparent on examination after death, may have been overlooked in examinations during life. As regards the connection of cardiac affections with renal lesions in cases of Bright's diseases, I have nothing to add here to what has been said in a previous section.

The occurrence of pericarditis in only one case in the group of cases in which recovery took place, and in no case in the group of cases the ending of which is not known, illustrates the fact that this complication of Bright's diseases is generally fatal.

5.—THE PROGRESS IN THESE CASES OF BRIGHT'S DISEASES, THE DURATION, AND THE IMMEDIATE CAUSES OF DEATH.

I shall consider the progress in these cases of Bright's diseases, the duration, and the immediate causes of death, under separate heads.

The Progress in these Cases of Bright's Diseases.

In a large majority of cases, Bright's diseases are steadily progressive, as shown by their symptomatic phenomena. But, in a certain proportion of cases, their progress appears to be interrupted, and there are intermissions when recovery may seem to be near at hand, or even to have taken place. The remarkable latency of these diseases prior to the first manifestations, when it is certain that the renal affection must have existed for a considerable period, has been already illustrated. I shall now cite some cases illustrating the occurrence of intervals in which this latency is shown after notable manifestations of the renal affection have taken place.

CASE I.—Mr. D., aged about fifty-six, a stout, vigorous man, was seen by me, in consultation with Dr. C. D. Smith, in

March, 1865. At that time he was suffering much from cephalalgia. There was anorexia, and, of his own accord, he complained of a taste of hartshorn. The urine contained albumen in abundance, and waxy casts. He had, for a time, a little œdema of his lower limbs. The heart was enlarged, without any cardiac murmur. Under treatment with purgatives and tonics he improved, and, after a few weeks, seemed nearly to have regained his usual health. The urine, however, continued to be albuminous. In the following May the cephalalgia returned; and, on getting up to go to the water-closet, after having retired at night, he fell upon the floor in coma. He had a slight convulsion. I saw him with Dr. Smith shortly after this occurrence, and remained with him most of the night. He emerged from the state of coma in a short time, and became actively delirious, struggling and shouting, so that he was brought under the influence of chloroform and kept under it for several hours. On the following day he became rational. After this he improved, and again seemed almost well; the urine, however, continued to contain albumen in abundance. In June he went to his country-seat in Vermont. Here he had repeatedly attacks of convulsions, followed by active delirium, continuing for several days. In the intervals between these attacks he improved to such an extent that he seemed to be on the road to recovery. At length, vomiting became a prominent symptom; and death took place, apparently from inanition, early in October. There was no autopsy in this case.

CASE II.—Miss II., aged eighteen, was seen by me in consultation with Dr. Lutkins, together with the late Dr. Olcott, of Jersey City, April 22, 1866. A month previously she became anasarcaous, having had apparently excellent health up to that time. Dr. Lutkins found the urine scanty (six or eight oz. in twenty-four hours) and loaded with albumen. She was treated with cathartics and small doses of mercury. Under this treatment the quantity of urine became greater, the anasarca nearly disappeared, the albumen in the urine was much diminished, and the patient seemed to be on the road to recovery, when epileptiform convulsions occurred, the urine at the same time becoming again scanty. She had numerous short convulsions.

After a few days these ceased, and she again appeared to be improving, when the convulsions returned, having been now preceded and being accompanied by vomiting. This recurrence of the convulsions was on the day before my visit. I found her pallid, with some œdema of face and limbs, the mind intact, the heart's action very slow (thirty-two per minute) and irregular. The urine was scanty; it contained albumen in abundance, also large waxy casts, fatty casts, and crystals of uric acid. Croton-oil had been already given. Elaterium was suggested and employed. The convulsions, however, returned, and death took place on the day following that of my visit.

CASE III.—This case is very remarkable as an example of an interval of three months between attacks of uræmic intoxication, the evidences of renal disease, inclusive of albumen and casts, having disappeared in this interval.

Mr. D., aged about fifty-six, of a full habit and a free liver, consulted me in June, 1866, with reference to disturbed action of the heart. I found the evidence of some enlargement of the heart, with no cardiac murmur, the heart-sounds feeble, and the impulse not appreciable. The urine was not examined. Under the use of tonic remedies, and improved dietetic habits, his health improved, and the sounds of the heart became stronger. Fatty degeneration of the heart was considered as probable.

On the 29th of the following September, apparently being well, while transacting business in a bank, he suddenly fell down in a state of coma. Epileptiform convulsions followed. He was first seen by Dr. Charles Y. Swan, and, in a short time, by his family physician, Dr. Louis A. Rodenstein. The convulsions recurred at short intervals, and were violent. I saw him several hours after the attack. Leeches had been applied to the temples, and podophyllin had been given, which had operated moderately. He had now partially emerged from the coma. The urine had been examined, and was found to contain albumen in abundance. Elaterium was subsequently given, and warm applications made to the extremities.

I visited him on the following day with Drs. Rodenstein and Swan, and Prof. Markoe. He had also been visited by Dr. W. H. Draper. The convulsions had not recurred,

and he had passed a comfortable night. The elaterium had operated freely, causing large watery evacuations. He had perspired freely. The mental faculties were partly restored, and in this respect there was progressive improvement during the day. A systolic murmur was heard in the second intracostal space on the left of the sternum, the murmur not being propagated into the carotids.

On the day following, in the afternoon, he had regained, fully, his mental faculties, and he was quite comfortable. Moderate purging with elaterium had been kept up, and the skin was still perspiring. The urine contained less albumen than on the preceding day. The sediment examined by Dr. Draper and Dr. Swan was found to contain tubular casts, varying in diameter from $\frac{1}{3500}$ to $\frac{1}{1000}$ of an inch, some of them hyaline, and some granulo-fatty, together with renal epithelium, which was coarsely granular and fatty.

On the next day the improvement was still more marked, and on the day following (October 3d) he was removed to his residence at Washington Heights. A specimen of urine, obtained on the day before his removal (October 2d), was examined by Dr. A. Flint, Jr., and found to contain neither albumen nor casts. Subsequently another specimen, which was sent to me, was examined with the same result. In a note dated October 17th, Dr. Rodenstein informed me that repeated examinations of the urine continued to show absence of albumen and casts, and that the patient was apparently well.

Mr. D. remained apparently in good health for about three months. At the end of this period, the urine, examined by Dr. J. B. Reynolds and Dr. J. S. Thebault, was found to contain albumen and casts. This was in the latter part of January, 1867. In February he made arrangements for going to Europe, and had some business annoyances. On the evening of February 18th, while engaged in a game of cards with his family, he was suddenly attacked with convulsions. The convulsions recurred at intervals up to 11 A. M., of the following day, and in the intervals he was nearly comatose. I saw him in the evening of February 19th, in consultation with Dr. Reynolds and Dr. Thebault. He was in a state of stupor, but he could be roused sufficiently to reply to a few questions. The

convulsions were not preceded by vomiting, nor by any premonitions. He had already been purged, but it was agreed to resort to elaterium. On the next day his condition was somewhat improved. I did not see him afterward. Death took place February 22d. There was no autopsy.

The foregoing illustrations of latency and intermittency, after notable manifestations of Bright's disease, and the occurrence, unexpectedly, of uræmic coma and convulsions, have been taken from the groups of cases ending fatally. I shall now introduce a succinct account of two cases, in which the renal disease has apparently not progressed, in one of the cases for two and a half years, and in the other case for more than one year, the patients being at the present time living, and in a comfortable state of health.

CASE IV.—Mr. J., aged twenty, was seen by me in consultation with Dr. George A. Peters, November 10, 1866. He had then pneumonia affecting the lower lobe of the right lung. The urine had a notably sooty appearance; it contained albumen in abundance and hyaline casts. There was moderate œdema of the lower limbs, which had existed for some weeks prior to the pneumonia. He recovered from the pneumonia; he improved as regards appearance and strength; the urine lost the sooty appearance, but it continued to contain albumen. He was treated with occasional hydragogue cathartics, with diuretics, and with tonic remedies. In January, 1867, his general health was fair, but albuminuria continued. In this month he sailed for the West Indies and Europe. This patient, since the date just named, has not been under my observation; but I have been informed, while writing this report (March, 1869), that, although he still has albuminuria, he appears to be in fair health, and is about to be married.

CASE V.—Mr. S., merchant, aged thirty-one, was seen by me in consultation with Dr. S. B. Tuthill, May 19, 1868. The history of the case was as follows: A year previously, he had an attack of vomiting, and was thought to have gastritis. He was then in Nassau. A similar attack occurred in October, 1867. In January, 1868, he had another similar attack, and with the vomiting he had two fits of epileptiform convulsions. Ten days before my visit, another attack occurred, and

with this attack he had two paroxysms of convulsions. Dr. Tuthill had charge of the case in January, and he then found the urine to contain albumen and granular casts. After the patient's recovery from the attack which then occurred, the albumen in the urine became less, and the casts were fewer, but neither completely disappeared. In the interval, however, as in the previous intervals, his health was apparently good, and he was actively engaged in business. In the attack which occurred in May, the urine was loaded with albumen, and contained an abundance of granular casts, the quantity being about normal, and the sp. gr. 1.010. With the attack in January, his vision was impaired. The impairment nearly disappeared afterward, but considerable mistiness existed when I saw him in May. His aspect was healthy. There was no dropsy. There was no febrile movement, as determined by the pulse and thermometer. The vomiting was sudden and explosive. There was no diarrhoea. Prior to, and during this attack, cephalalgia was a prominent symptom. He had also, occasionally, vertigo, and his sleep had been dreamy and disturbed. The skin was not dry, and he perspired easily. As regards treatment, it was agreed that the urine should be watched with reference to the quantity of urea, and elimination to be aided, if necessary, by the bowels and skin, the strength of the patient to be supported by a nutritious diet and tonic remedies.

I did not see the patient afterward, but Dr. Tuthill has informed me (April, 1869) that he is apparently, at this time, in good health.

An important point, which I desire to illustrate by these cases, as well as by others previously introduced, is, that Bright's diseases may remain latent for a considerable period prior to any special manifestations, and that, after such manifestations occur, there are sometimes long periods during which the renal disease appears not to be progressive. In the group of cases, the ending of which is not known, the patients having passed from under my observation, are several cases, in which, notwithstanding the existence of renal disease, as shown by the urine, the improvement which had taken place and the condition of health rendered it probable that the affection of

the kidneys was stationary, if not retrogressive. Patients repeatedly were discharged from hospital because they felt themselves able to return to their occupations, although albuminuria persisted. The importance of this point relates especially to its practical bearing. If it be true, as clinical observations warrant us in believing, that a certain amount of renal disease may be so tolerated by the system as not to interfere with the possession of a fair amount of health for an indefinite period, it becomes a capital object of medical practice to promote this tolerance, and thus to prevent or postpone those complications and effects which impair health and destroy life.

Duration.—In many of the cases, in which the ending either in death or recovery was known, it is impossible to determine the duration, owing to the date of the first symptoms not having been noted with definiteness in the histories. In the group of cases, the ending of which is not known, this group including a few cases in which the patients are known to be living, the duration is, of course, indeterminable. This last group of cases, however, furnishes some examples of a considerable duration, with, in some cases, such a degree of improvement that there is room for the supposition that recovery may have taken place after the patients had passed from my observation. What shall be taken as criteria of the commencement of the renal disease? In answer to this question, I would say that it seems to me proper to consider the renal disease as existing only when some of the special manifestations are present, namely: dropsy, uræmic coma, or convulsions, and albumen or tubular casts in the urine. The criteria pertaining to the urine are, in general, not ascertained until some of those previously named occur. It is probable that, in many cases, albumen or casts in the urine would have been found, for a greater or less period, prior to the other manifestations, had urine been examined; but, as a rule, patients do not come under observation until after the development of either dropsy, uræmic phenomena, or some complication of the renal disease. That lesion of the kidneys, in chronic Bright's diseases, often exists for months, and even years, before the occurrence of any of the manifestations which I have called special, can hardly be doubted; but, in endeavoring to deter-

mine retrospectively the beginning of these diseases in a series of cases, the propriety of considering symptoms and ailments which may precede the renal manifestations, and which may reasonably be supposed to be dependent upon disease of the kidneys, is doubtful. In short, the criteria which have been named should be regarded as the only events in the previous history which are positively diagnostic. Adopting this course, I shall proceed to give the results of the analysis of the fatal cases, and of those ending in recovery, in which the commencement of the disease can be determined. Afterward I will cite the duration in some of the cases, the ending of which is not known, and the condition at the time when the patients passed from under observation.

Of the fatal cases, the duration is determinable in 29. The case in which the duration was shortest ended fatally a few hours after the occurrence of uræmic coma and convulsions. Vomiting preceded these uræmic events for several days, and there was suppression of urine. This case has been given among the cases illustrative of the latency of renal disease. The next shortest duration was 2 days. This case has also been given in the same connection as the preceding. The duration in two cases was 4 days, and in one case 6 days. The longest duration was 2 years; the next longest, 315 days; the next, 240 days; and the next, 210 days.

It will be of interest to study the duration in these 29 cases, distributed into the following groups: 1st, cases in which death was attributable to the uræmic events, that is, to coma and convulsions; 2d, cases in which death was due to asthenia or exhaustion; and, 3d, cases in which some complication or coexisting affection produced death.

The number of cases in the uræmic group is 14. In this group are contained the cases having the shortest and the longest duration, namely, two years and a few hours. The three periods of duration next to the maximum in this group are, 315, 180, and 150 days. The three periods next to the minimum are, 2, 4, and 6 days. The mean duration, exclusive of the case in which the duration was 2 years, and the case in which it was a few hours, is a fraction under 66 days.

The number of cases in the asthenic group is 9. The

shortest duration in this group was 4 days ; the longest was 240 days. The mean duration, is a fraction over 134 days.

In six of the fatal cases death was due to complications or coexisting affections. The facts in these cases, respectively, are as follow : Case I. Death was due to œdema of one lung and hydrothorax on the opposite side, old, universal, pleuritic adhesions existing on the side in which there was pulmonary œdema. The disease followed scarlatina, and the duration was 5 days. Case II. Death was due to pleuritis and pericarditis. The renal disease was developed during pregnancy, and the duration was about 30 days. Case III. Death was due to pericarditis, and the duration was about 60 days. Case IV. Death was due to œdema of the glottis, and the duration was 180 days. Case V. Death was due to disease of heart, and the duration was 102 days. Case VI. Death was due to peritonitis and pericarditis, and the duration was 35 days.

Of the cases ending in recovery, the duration is determinable in 15. The minimum of duration in this group was 7 days ; this was the duration in two cases. The next shortest duration was 16 days ; the next 20 days, and the next 22 days. The maximum of duration was 245 days. The next longest duration was 122 days, the next 91 days, and the next 82 days. The mean duration, in this group of cases, is a fraction over 52 days.

From the group of cases of which the ending is not known, the following are selected, as showing the duration up to the time when the cases passed from my observation, together with the condition at that time :

CASE I.—After 90 days dropsy had disappeared, the albumen in the urine was much diminished, and the patient was in all respects greatly improved.

CASE II.—In this case albuminuria had existed for 4 years. The patient did not consider himself a sick man ; but he complained of becoming easily fatigued and of want of breath on exercise. There was a mitral systolic cardiac murmur in this case.

CASE III.—The disease had existed 28 days before his admission into hospital. After remaining in hospital 45 days,

dropsy had disappeared, and he reported that he felt well enough to go to work as a laborer. He left the hospital, but was readmitted in 20 days, with a return of dropsy. After some weeks the dropsy again disappeared, and the albumen in the urine was much diminished, but it did not disappear. He was employed in out-of-door work at the hospital. Six months afterward he looked well; he had gained in weight, and was able to do light work; the urine remaining moderately albuminous.

CASE IV.—In this case the disease had existed for 60 days before his admission into hospital. After four months in hospital, he reported well enough to return to his occupation, namely, a cook on board ship. The state of the urine at the time of his discharge is not noted.

CASE V.—After seven months in hospital, the patient reported well enough to go to work as a plasterer; the state of the urine at the time of his discharge not being noted.

CASE VI.—After 84 days the patient was free from dropsy, and reported well enough to return to work as a laborer.

CASE VII.—More or less œdema of the limbs had existed in this case for 18 months; the patient, however, continuing to work as a furrier. After three days in hospital he was discharged at his request, in order that he might return to work, the œdema having diminished, but not disappeared.

CASE VIII.—It is stated that in this case the disease had existed but for a short time previous to admission into hospital. After 16 days in hospital the dropsy was much diminished, and he left the hospital to return to work as a laborer.

CASE IX.—The disease had existed for 60 days before his admission into hospital. He remained in hospital 60 days, and left notably improved.

The foregoing results of the analysis show a very wide range of variation as regards the duration of Bright's diseases. Taking, as the criterion of the commencement of the renal affection, uræmic coma in one case, and dropsy with albuminuria in another case, the opposite extremes, represented by two cases, are a few hours and four years; and in the latter case the disease had not ended. It will be observed that the

average duration in fatal cases ending by asthenia is double that of cases ending with uræmic coma or convulsions. The maximum of the duration in cases ending in recovery is worthy of note, namely, 122 days; and the average duration in these cases does not much fall below that in the uræmic group of fatal cases.

Causes of Death.—As regards the immediate causes of death, cases may be distributed here, as in the preceding section, into three groups. The first group will embrace cases in which death is due directly to uræmic coma or convulsions. In a certain proportion of cases patients die in a state of coma, which may or may not have been preceded by convulsions; and in some cases death occurs during a severe attack of convulsions. It does not, however, follow, in cases which prove fatal, after one or more attacks of coma or convulsions have occurred, that the fatal result will be due to the recurrence of these uræmic events; for sometimes, after these events have occurred repeatedly, the patient at length dies from exhaustion, dependent on innutrition, together with other causes. The second group will embrace the cases in which death is attributable to exhaustion, produced in part, indirectly perhaps, by the uræmic events just named, but in a certain proportion of cases taking place without these events having occurred during the whole course of the disease. Cases in which the exhaustion is due to complicating or coexisting affections, are not included in this group. The fatal exhaustion is often very evidently the effect of innutrition, and in these cases vomiting and purging are apt to be prominent symptoms. The third group will embrace cases in which death is attributable, measurably or entirely, to complicating or coexisting diseases. Dividing the fatal cases into these three groups, I shall give a brief statement of the immediate cause or causes of death in each of the cases, the history of which contains information on this point, appending the kind of renal affection when this was ascertained by *post-mortem* examination.

Cases in which Death was attributable to Uræmic Coma or Convulsions.

CASE I.—After delirium and jactitation, death occurred

suddenly in coma. There was suppression of urine for several days in this case. The kidneys were noted as granular.

CASE II.—Died in coma, which was preceded by delirium and sanguinolent dejections. The kidneys were fatty.

CASE III.—Died in an attack of convulsions. The kidneys were fatty.

CASE IV.—Died in deep coma. The kidneys were fatty.

CASE V.—Died in coma. The kidneys were contracted.

CASE VI.—Died in coma. The kidneys were contracted.

CASE VII.—Died in coma, preceded by convulsions. The kidneys were contracted.

CASE VIII.—Died in coma, preceded by convulsions. The kidneys were contracted.

CASE IX.—Died in coma. The kidneys were fatty.

CASE X.—Sudden death in coma. No autopsy.

CASE XI.—Died in coma, preceded by convulsions. No autopsy.

CASE XII.—Sudden death in coma with convulsions. No autopsy.

CASE XIII.—Died in coma, preceded by convulsions. No autopsy.

CASE XIV.—Died in coma. No autopsy.

CASE XV.—Died in coma. No autopsy.

CASE XVI.—Died in coma with convulsions. No autopsy.

CASE XVII.—Died in convulsions. No autopsy.

CASE XVIII.—Died in coma, preceded by convulsions. No autopsy.

Cases when Death was attributable to Exhaustion.

CASE I.—Vomiting, diarrhœa, and innutrition. Form of disease of the kidneys not determinable.

CASE II.—Vomiting, diarrhœa, and innutrition. Large white kidneys.

CASE III.—Vomiting, diarrhœa, and innutrition. Large white kidneys.

CASE IV.—Innutrition. Fatty kidneys.

CASE V.—Innutrition, preceded by vomiting and diarrhœa.

Repeated attacks of coma, convulsions, and delirium had occurred. No autopsy.

CASE VI.—Innutrition. The dropsy excessive. No autopsy.

Complications or Coexisting Affections constituting measurably or entirely the Causes of Death.

CASE I.—Pulmonary œdema of one lung, which was universally adherent by old pleuritic adhesions, and hydrothorax on the opposite side. Tubular nephritis.

CASE II.—Pleuritis and pericarditis. Probably tubular nephritis.

CASE III.—Pneumonia in first stage. Form of renal disease not determinable.

CASE IV.—Pericarditis. Contracted kidneys.

CASE V.—Disease of heart. Typhoid delirium and exhaustion. Contracted kidneys.

CASE VI.—Pulmonary congestion and œdema, with aortic lesions and enlargement of the heart. Also exhaustion from innutrition. Contracted kidneys.

CASE VII.—Chronic pericarditis, with large effusion. The death apparently hastened by the use of elaterium given with reference to the pericardial effusion. Contracted kidneys.

CASE VIII.—Recent pleurisy, tuberculous disease of the lungs existing. Fatty kidneys.

CASE IX.—Much hydroperitonæum and hobnailed liver; but death took place in coma. Fatty kidneys.

CASE X.—Pericarditis. Contracted kidneys.

CASE XI.—Great contraction of the mitral orifice of the heart, giving rise to great dyspnœa. Contracted kidneys.

CASE XII.—Œdema of glottis, for which laryngotomy was performed, with relief. Death in coma the following day. The heart was much enlarged. One kidney destroyed by cysts, and the other kidney fatty.

CASE XIII.—Pulmonary œdema; but death took place in coma. Fatty kidneys.

CASE XIV.—Much hydroperitonæum. Tapping resorted to. Death from exhaustion. Waxy kidneys.

CASE XV.—Much hydroperitonæum, and contracted liver. Sudden death took place in coma. Fatty kidneys.

CASE XVI.—While apparently improving, the patient was suddenly seized with vomiting and purging, accompanied by great dyspnœa, with lividity, and he died in a few hours, without coma or convulsions. There was moderate œdema of the lungs. The pericardium contained three and a half ounces of liquid. The brain was normal. The heart weighed eleven ounces, and the valves were sound. Fatty kidneys.

CASE XVII.—Pulmonary œdema, with fatty degeneration of the heart, and aortic insufficiency. Kidneys not examined.

CASE XVIII.—œdema of glottis, and death from suffocation. Fatty kidneys.

CASE XIX.—Rupture of aneurism of abdominal aorta. One kidney contracted, and the other kidney fatty.

CASE XX.—Peritonitis and pericarditis. No autopsy.

CASE XXI.—Hydroperitonæum, for which tapping was employed. Gangrene of scrotum following punctures to relieve œdema. Death from exhaustion.

A reviewal of the number of cases in these three groups shows that, of 45 fatal cases in which the causes of death appear in the histories, in 18 the death was attributable to uræmic coma or convulsions; in 6 the death was due to exhaustion, irrespective of complications or coexisting affections; and in 21 the causes of death related, measurably or entirely, to complications or coexisting affections. It will be observed that, in some of the cases in the last group, the patients died in coma, and in some the death was due to exhaustion.

6.—TREATMENT.

In none of these cases of Bright's diseases was any treatment pursued with a view to a direct curative effect upon the renal affection. The therapeutical measures employed, aside from those which were merely palliative and those which were addressed to concomitant affections, had reference to the following objects: 1st, the elimination of excrementitious principles from the blood when uræmic coma or convulsions were present; 2d, the removal of dropsical effusion; 3d, the diminution of albumen in the urine, and 4th, improvement of appetite, of digestion, and of the general condition of the patient.

Premising that in a considerable number of cases the notes are defective as regards measures of treatment, I shall interrogate the histories containing information under this head, with respect to the different remedies which were employed for the objects just named.

Diuretics.—Diuretic remedies entered prominently into the treatment of 19 of the cases in which the notes embrace an account of therapeutical measures. These remedies were always given with reference to the dropsy, never for elimination when important uræmic events occurred. Different diuretic remedies were used, sometimes singly, and sometimes in combination. The facts with respect to diuretics in these 19 cases will be most conveniently presented by distributing the cases according to the diuretics used.

Cases in which the Bitartrate of Potassa was used.

CASE I.—Used with no benefit. A fatal case of the smooth white kidney.

CASE II.—The patient was at once treated with this remedy, half an ounce being dissolved in a pint of water, and a wineglassful given every four hours. It acted as a diuretic, and in a week the dropsy, which was considerable, had entirely disappeared. Improvement took place in other respects; the patient was up and able to do light work. Under the use of gallic acid for ten days the dropsy returned. The bitartrate of potassa was then resumed, and the dropsy speedily disappeared. The patient then left the hospital, thinking he was well enough to return to work as a laborer. Twenty days from the date of his discharge he was readmitted, the dropsy having returned. The remedy was again resumed, and in a short time the dropsy disappeared. The further progress of the case was not known.

CASE III.—After purging with the sulphate of magnesia, this case was treated with the bitartrate of potassa, and the patient was convalescent in seven days. The disease followed scarlatina.

CASE IV.—Under the use of the bitartrate of potassa the quantity of urine was doubled, and the dropsy disappeared. Recovery in this case.

CASE V.—In this case, after free purging, the bitartrate of potassa was used, and under its use the dropsy disappeared. Recovery in this case.

CASE VI.—There was much dropsy in this case. It disappeared under the use of the bitartrate of potassa.

Cases in which the Acetate of Potassa was used.

CASE I.—The acetate of potassa, $\mathfrak{z}$ ss daily, was given without any diuretic effect, and with no benefit. A fatal case of contracted kidneys.

CASE II.—This remedy, given as in the preceding case, increased the quantity of urine, but with no benefit. A fatal case of fatty kidneys.

CASE III.—This remedy, given as in the two preceding cases, acted efficiently as a diuretic, and under its use the dropsy was much diminished. The ending in this case not known.

CASE IV.—The acetate of potassa was given together with digitalis, the hot-air bath being also employed. The dropsy was much diminished, and there was notable general improvement. The ending in this case not known.

CASE V.—The dropsy, which was considerable, disappeared under the use of the acetate of potassa. Recovery in this case.

Case in which the Nitrate of Potassa was used.

In this case half an ounce of the nitrate of potassa was given daily. It acted as a diuretic, and under its use notable improvement took place. Recovery in this case.

Cases in which several Diuretics were combined, and Cases in which the Diuretic Remedies are not specified.

CASE I.—Squill, digitalis, the infusion of juniper-berries, and the nitrate of potassa, were given in conjunction. The quantity of urine was notably increased; the dropsy disappeared, and there was marked general improvement. The ending of this case was not known.

CASE II.—Squill and digitalis, with blue mass, together with the bitartrate of potassa, were given in conjunction. The

dropsy disappeared, and there was notable improvement. Recovery in this case.

CASE III.—The notes simply state that the case was treated with diuretics. The disease followed scarlatina and diphtheria. Hemiplegia was a sequel as well as dropsy. Recovery in this case.

CASE IV.—In this case the dropsy, which was considerable, disappeared under the use of diuretics, the remedies not being named. Recovery in this case.

The iodide of potassium was given in one fatal case with no benefit, the disease being the smooth white kidney. This remedy was also given, with no benefit, in a case the ending of which was not known. It was given, after purging with the sulphate of magnesia, in conjunction with an acidulated emulsion of pumpkin-seeds, in a case in which the disease followed scarlatina, the patient being convalescent in four days.

The external use of diuretics was tried in one fatal case without any benefit. Squill and digitalis were applied externally in another case, in which jalap and the bitartrate of potassa were also employed. It is not noted whether a diuretic effect was produced; but the dropsy disappeared, and the case ended in recovery.

The foregoing facts go to show an increase of urine under the use of diuretics, and their efficacy as regards the removal of dropsy, in certain cases. They do not show any unfavorable effect in any case. It has been a mooted question whether, in cases of tubal or desquamative nephritis, diuretics are not injurious. It may, perhaps, be assumed that this form of disease existed in most of the cases ending in recovery. Now, in several of these cases diuretics acted efficiently, the dropsy disappeared, and improvement in general took place under their use. So far as the facts which have been presented bear upon this question, they are in favor of the employment of diuretics in the form of renal disease just named. Doubtless other diuretic remedies would have proved equally, if not more, efficacious. I have been led to observe in some cases not recorded a notable diuretic effect from the infusion of parsley-root.

Cathartics.

Cathartic remedies were employed with reference to the elimination of excrementitious principles from the blood when uræmic coma or convulsions occurred, and also for the removal of dropsical effusion. For both these objects, cathartics having a hydragogue operation were used, namely, elaterium, croton-oil, the bitartrate of potassa and jalap, separately or combined, and the sulphate of magnesia. Cathartics entered, more or less prominently, into the treatment of 28 cases. In stating briefly the facts regarding the treatment in these 28 cases, I shall adopt the arrangement just pursued with respect to diuretics.

Cases in which Elaterium was used.

CASE I.—In this case one-fourth of a grain of elaterium was given daily for 54 consecutive days, with reference to dropsy. It produced several liquid dejections daily, the dropsy steadily diminished, and the patient constantly reported improvement. After 54 days it was suspended on account of nausea, and gallic acid was given. The dropsy increased, and, after 10 days, the elaterium was resumed for a short time with the same effect as before; the strength of the patient declining, tonics were substituted and continued until the fatal termination. The kidneys were fatty.

CASE II.—Elaterium relieved in this case, notably for a time, uræmic stupor. This was a fatal case, and the kidneys were contracted.

CASE III.—In this case elaterium was given with reference to dropsy. The dropsy was somewhat diminished. Subsequently, convulsions occurred, and the measures employed were cupping over the loins and the hot-air bath, without benefit. This was a fatal case, and the kidneys were fatty.

CASE IV.—In this case chronic pericarditis with large effusion existed. Elaterium was given to promote absorption of the pericardial effusion. The patient, already feeble, was much prostrated by the effect of the remedy, and the fatal ending was probably hastened by it. The kidneys were contracted.

CASE V.—In this case elaterium was given repeatedly, the

patient being in uræmic coma. The doses, however, were always immediately rejected by vomiting. It was given also by enema, but with very little effect. This case was fatal. No autopsy.

CASE VI.—Elaeterium, given hourly in doses of gr. j, in uræmic coma and convulsions, was of no avail. The case ended fatally. No autopsy.

CASE VII.—Uræmic convulsions existed in this case. Elaeterium was given freely without avail. This was a fatal case. No autopsy.

CASE VIII.—Uræmic coma and violent convulsions in this case occurred suddenly, when the patient apparently was well. Podophyllin was first given with a moderate purgative effect, and leeches applied to the temples. Free purging was induced by elaterium. The convulsions ceased, and the patient emerged from the coma after about twelve hours. He apparently recovered; but coma and convulsions recurred suddenly five and a half months afterward, and proved fatal. No autopsy.

CASE IX.—Coma and convulsions existed, and elaterium was given without avail. This was a fatal case. No autopsy.

CASE X.—Anasarca was much diminished, together with the albumen in the urine, and notable general improvement took place in this case, under treatment with elaterium from time to time, together with chalybeate tonics, the tepid bath, and exercise in the open air. The ending in this case was not known.

CASE XI.—In this case elaterium was repeatedly used with reference to dropsy, which was at once removed by it. In this case the disease still exists, as shown by albuminuria, but the patient is in fair general health.

CASE XII.—As regards dropsy, a little œdema below the eyes only existed in this case. There was complete amaurosis. The patient was in hospital 11 days, and during this time elaterium was given, together with the iodide of potassium, without any benefit.

CASE XIII.—The disease in this case was developed during pregnancy, and premature confinement took place. The anasarca was very great, the lower limbs being enormously swollen prior to the miscarriage. Afterward the anasarca was

much diminished, but hydrothorax existed, both sides of the chest being two-thirds filled with liquid. The suffering from dyspnœa was extreme, and the danger of death seemed imminent. The patient was obliged to keep the sitting posture, and any movement of the body occasioned such an increase of the dyspnœa as to threaten life. Elaterium given under these circumstances produced large and frequent watery dejections with immediate and great relief. The hydrothorax was at once diminished, but it afterward increased so as to produce nearly the same amount of distress as before; and elaterium was again resorted to with the same prompt and effectual relief. Recovery took place in this case.

CASE XIV.—Dropsy was developed in this case, after admission into hospital. It progressively increased, under the use of iron and quinia, for 10 days. Elaterium was then employed, and it was repeated twice, each time gr. 1-4 being given every two hours until the cathartic operation began. The effect upon the dropsy was marked. Recovery in this case.

CASE XV.—Hydrothorax existed in this case to such an extent that the patient was obliged to keep the sitting posture, and suffered much from dyspnœa. Purging was kept up by elaterium for two weeks, and under the use of this remedy the dropsy disappeared. Recovery in this case.

Cases in which Jalap and the Bitartrate of Potassa were used.

CASE I.—In this case the anasarca was excessive; the eyes were partially closed by the œdema of the face, the limbs were enormously swollen, and vesication on the legs had taken place, occasioning much draining away of liquid. There existed hydrothorax to such an extent that the patient kept the sitting posture. In seven days, under the use of the *pulvis purgans*, the hot-bath being employed four times, the anasarca was removed, and the patient was able for a time to be up and walking about the ward. Death subsequently took place by asthenia. No autopsy.

CASE II.—There was moderate dropsy in this case. The patient was in hospital about six months. During much of this time jalap was given so as to produce moderate purging,

and she had also gallic acid; no benefit was derived from this treatment, and she left the hospital unimproved.

CASE III.—There was considerable dropsy in this case, and the bitartrate of potassa was given in doses of half an ounce daily. It operated as a mild hydragogue. This was the only remedy given. In four weeks the patient was discharged free from dropsy, and feeling well enough to return to his work as a laborer.

CASE IV.—There was moderate anasarca in this case. Under the use of jalap and the bitartrate of potassa in purgative doses, the dropsy rapidly disappeared. Recovery in this case.

CASE V.—The anasarca was great in this case. Jalap and the bitartrate of potassa, given so as to produce fresh purging, preceded the use of the bitartrate of potassa as a diuretic. The dropsy was removed, and the patient discharged well at the end of fifteen days.

CASE VI.—There was much anasarca in this case. It diminished greatly under the use of the *pulvis purgans*, and the hot-air bath. Tonics were then given until recovery took place.

Cases in which Croton-Oil was used.

CASE I.—Croton-oil was given in this case during convulsions which recurred at intervals during twenty-four hours. This remedy was followed by the nitrate of potassa as a diuretic. After the convulsions ceased to recur, the patient remained for two days in a semi-comatose state. Recovery in this case.

CASE II.—In this case profound coma occurred on the second day after admission into hospital. It was accompanied by tracheal râles, and the patient appeared to be moribund. She was purged freely with croton-oil, and the hot-air bath was employed. Under these measures she emerged from the coma. Recovery in this case.

Cases in which the Sulphate of Magnesia was used.

CASE I.—After treatment with diuretics, under which much improvement had taken place, the sulphate of magnesia was given. The dropsy disappeared under the use of the latter. Recovery in this case.

CASE II.—In this case purgation by means of the sulphate of magnesia preceded the use of the iodide of potassium, and an acidulated emulsion of pumpkin-seeds. The disease followed scarlatina; convalescence in four days.

CASE III.—Purgation by means of the sulphate of magnesia, in this case, preceded the use of the bitartrate of potassa as a diuretic. The disease followed scarlatina, and the patient was convalescent in seven days.

CASE IV.—The sulphate of magnesia in this case was employed prior to the bitartrate of potassa as a diuretic. Recovery in this case.

In one case, the anasarca being great, it is simply stated that purgatives were first used, and afterward tonics. Recovery took place in this case.

Reviewing the facts relating to cathartics, of the 15 cases into the treatment of which elaterium entered, this remedy was given in 6 cases with reference to uræmic phenomena; in 7 cases with reference to dropsy; in one case of pericarditis with large effusion, and in one case in which amaurosis was associated with slight œdema of the face. In the case last named, the remedy was of no avail. In the case of pericarditis, with effusion, its effect was apparently injurious. In 4 of the 6 uræmic cases, it was of no avail, but in one of these cases the remedy was not retained by the stomach. Its operation was apparently notably useful in one of these cases, namely, Case VIII.; and it was measurably useful in another case, namely, Case II. In all the cases in which it was used with reference to dropsy, the effect was apparently useful. In 2 of these cases there was reason to suppose that life was saved by this remedy, namely, Cases XIII. and XV.

Of the 6 cases into the treatment of which jalap and the bitartrate of potassa, one or both, entered, in all, the object was the removal of dropsy. The treatment was effective in all save one case, no benefit being produced in that case, namely, Case II. Great dyspnœa from hydrothorax existed in one of these cases, namely, Case I.

In the two cases in which croton-oil was used, there was coma, and in one of the cases convulsions. In both cases relief

followed the operation of this cathartic, and in both cases recovery took place.

Of the 4 cases in which the sulphate of magnesia was given, in all, the object was the removal of the dropsy. In each of these cases diuretics entered into the treatment, either before or after the purgative; and in all the cases recovery took place.

These facts certainly go to show the utility of hydrogogue cathartics given with reference both to uræmia and to dropsy. With reference to the latter, their utility is shown oftener and is more marked. It is, however, to be borne in mind, that uræmic coma and convulsions are events denoting vastly more immediate danger than dropsy, and that, often, when these events occur, life is destroyed so quickly that there is not much time for the employment of means for elimination. This consideration, it is hardly necessary to add, leaves no room for choice between diuretics and cathartics. To trust to the former, under such circumstances, is never warrantable, and, in fact, would be culpable. Nor is there much scope as regards the cathartics to be selected. Elaterium and croton-oil are preëminently the articles to be used.

With regard to elaterium as a remedy for the removal of dropsy, I have frequently met with practitioners who entertain, as it seems to me, undue apprehensions of injury from it. It is a powerful remedy, and its use calls for care and judgment; but, whenever the diminution or removal of dropsical effusion is urgently indicated, there are few, if any cases, in which this remedy may not be judiciously used. If the condition of the patient be such that there is room to fear harm from the depression which may be produced by its operation, it should be given in small doses, namely, one-eighth or one-fourth of a grain, repeated after intervals of one or two hours; and it should be discontinued when the purgative operation begins. This collection of cases furnishes some striking illustrations of the value of this remedy in cases of hydrothorax with large effusion. I could cite other examples of hydrothorax occurring in connection with disease of the heart, as well as in Bright's diseases, which would, in like manner, exemplify the value of this remedy.

Cases in which the Hot-air and Vapor Bath were used.

The hot-air bath entered into the treatment in 7 cases. It was used to eliminate excrementitious principles through the skin, and, also, with reference to dropsy. The operation consisted in heating air by means of a spirit-lamp in an apparatus for the purpose, a tube connected with the apparatus being inserted under the bedclothes. In one case, heated vapor or steam was introduced under the bedclothes. The facts in these 8 cases, in which treatment with the hot-air or vapor bath is noted in the histories, are as follows :

CASE I.—The hot-air bath in this case sometimes produced copious perspiration, and the patient felt weakened by it. At other times it occasioned an uncomfortable sensation of heat. Evidently in this case it was not beneficial. It was employed with reference to dropsy. The case ended fatally, and the disease was the large white kidney.

CASE II.—The hot-air bath and cupping over the loins were employed in this case during convulsions, without avail. The case ended fatally, and the kidneys were fatty.

CASE III.—In this case the hot-air bath was employed, in conjunction with the use of iron and quinia, with reference to dropsy. The dropsy nearly disappeared, and, after three months, the patient left the hospital much improved. She returned in a month quite feeble, and died shortly after being readmitted. The kidneys were fatty.

CASE IV.—The vapor-bath was resorted to in this case after elaterium had been given repeatedly and not retained by the stomach. The patient was in uræmic coma. No benefit was obtained. The case ended fatally. No autopsy.

CASE V.—In this case there was much anasarca and great dyspnœa from hydrothorax. The dropsy was removed in seven days under treatment by means of the hot-air bath in conjunction with the use of the pulvis purgans. The case subsequently ended fatally. No autopsy.

CASE VI.—In this case the dropsy was considerable. The patient had the hot-air bath daily. The acetate of potassa and digitalis were also used. The dropsy was removed, and the improvement in other respects was marked. The ending

in this case is not known. It is noted in the history of this case that "the hot-air baths seemed extremely useful. Under their use the dropsy disappeared, and he improved *pari passu* in other respects."

CASE VII.—In this case the patient fell into deep coma on the second day after admission into hospital, and seemed moribund. She emerged from coma after free purgation with croton-oil. Afterward the dropsy disappeared, together with the albuminuria, under the use of the hot-air bath and the sulphate of magnesia. Recovery in this case.

CASE VIII.—It is only noted in this case, as regards treatment, that the hot-air bath was employed, and that, under its use, there was improvement. The subsequent treatment is not noted. Recovery in this case.

The hot-air bath has been much employed in Bellevue Hospital in cases of Bright's diseases. These few cases represent the results of a larger experience, by affording illustrations of the usefulness of this measure in some cases, and its inutility in other cases. It is a measure which may be employed tentatively, and continued or not according to the effect. If it do not produce free perspiration, it not only does no good, but it is, to say the least, annoying to the patient. If, when free perspiration is produced, it be followed by a sense of fatigue or prostration, its employment is not advisable. If well borne, its use may be continued, but only as an adjunctive measure when uræmic coma, or excessive anasarca, or convulsions, afford indications for prompt and efficient treatment. Alone it is not adequate to effect the objects of treatment under these circumstances.

Cases in which Gallic Acid was used.

Gallic acid entered into the treatment in 11 of the cases, the histories of which contain an account of the management. This remedy was given with a view to diminishing the amount of albumen in the urine, and thereby obviating a morbid condition supposed to be causative of dropsy. The facts in these 11 cases are as follows:

CASE I.—Gallic acid, together with quinia and iron, and the external use of diuretics, constituted the treatment in this

case. The treatment was without benefit. The case proved fatal, and the disease was the large white kidney.

CASE II.—After the use of elaterium for 54 consecutive days, with the effect of diminishing the dropsy, this remedy was discontinued, owing to its producing nausea, and gallic acid was given for 10 days. The dropsy increased during these 10 days, and the remedy was then discontinued. The case ended fatally, and the kidneys were fatty.

CASE III.—In this case gallic acid was used without effect. The dropsy was removed by diuretics. The ending in this case is not known.

CASE IV.—The dropsy in this case disappeared under the use of a diuretic remedy, namely, the bitartrate of potassa. The patient was then placed on the use of gallic acid in doses of grs. x, three times daily. The albumen in the urine became less under the use of this remedy, but the dropsy, to some extent, returned, and, after 10 days, the bitartrate of potassa was resumed with the same effect as before. This patient left the hospital much improved, and able to do light work.

CASE V.—Gallic acid, in doses of grs. v, three times daily, was given for some time in this case, without benefit. The dropsy was slight. The patient left the hospital afterward, feeling well enough to act as ship's cook.

CASE VI.—Dropsy was moderate in this case. Gallic acid grs. v, three times daily, with jalap as a cathartic every other day, constituted the treatment. The patient left the hospital unimproved.

CASE VII.—The dropsy in this case, which was considerable, was much diminished under the use of a diuretic remedy, namely, the acetate of potassa. Gallic acid was then given in doses of grs. v, three times daily, and, under the use of this remedy, the dropsy continued to diminish. The ending in this case not known.

CASE VIII.—There was much anasarca in this case. The treatment consisted of gallic acid, and the tincture of the chloride of iron. The patient remained in hospital 11 days, and left without any improvement.

CASE IX.—The dropsy in this case was considerable, and

it disappeared under the use of the bitartrate of potassa as a diuretic. After the disappearance of the dropsy, gallic acid was given in scruple-doses, and under the use of this remedy the albumen in the urine diminished. Recovery in this case.

CASE X.—Gallic acid in doses of grs. vj, three times daily, constituted the treatment in this case. The patient was 12 days in hospital, and left with no dropsy, and only a trace of albumen in the urine.

CASE XI.—In this case, after the dropsy had diminished much under the use of elaterium, gallic acid in scruple doses was given. It soon, however, occasioned vomiting, and was discontinued. Recovery in this case.

These cases furnish very little, if any, evidence in behalf of the utility of gallic acid. It is true that in one case, Case X., the dropsy disappeared, and the patient recovered under the use of this remedy alone; but the question arises, in view of the absence of evidence in the other cases, whether in that case the hygienic conditions would not probably have been sufficient without the use of the gallic acid.

Cases in which Tonic Remedies were used.

Tonic remedies, as a rule, entered more or less into the treatment whenever cases were under observation for any considerable period. It is very difficult to estimate the amount of benefit which may have been derived from them. I shall content myself with giving briefly the facts as noted in 16 cases, the histories of which contain information of the use of remedies of this class:

CASE I.—A fatal case, in which the disease was the large white kidney. Quinia and iron were used, with no apparent benefit.

CASE II.—In this case the treatment consisted of the use of quinia and iron in conjunction with the hot-air bath. Under this treatment the dropsy nearly disappeared, and the patient left the hospital at the end of three months, quite comfortable. She returned in a month, very feeble, and died shortly after readmission. The kidneys were fatty.

CASE III.—After the dropsy had become much diminished, and notable general improvement had taken place under the

use of elaterium, chalybeate tonics were given. The case passed from under my observation, and the progress afterward was not known.

CASE IV.—After the use of gallic acid without benefit, noticeable improvement in this case took place, under the use of quinia and iron. Patient left the hospital feeling able to work as ship's cook.

CASE V.—This case was treated solely by tonic remedies. The tonics given are not specified. After 16 days in hospital, the dropsy was greatly diminished, and the patient was discharged, feeling confident that he should soon be able to return to work as a laborer.

CASE VI.—In this case quinia and iron were given, and at the same time the acetate of potassa was used as a diuretic. Under this treatment the dropsy, which was considerable, diminished, and the general improvement was marked. The ending not known in this case.

CASE VII.—The tincture of the chloride of iron and gallic acid were used successively in this case. The patient left the hospital after 11 days, not improved.

CASE VIII.—It is simply noted in this case that the tonics were given after the dropsy had disappeared, under the use of diuretics. Recovery in this case.

CASE IX.—In this case, after uræmic convulsions and coma had disappeared under the use of croton-oil, followed by the nitrate of potassa, quinia and iron were given. Recovery in this case.

CASE X.—The citrate of iron and quinia and the citrate of potassa constituted the treatment in this case. The patient recovered and left the hospital after 20 days.

CASE XI.—In this case dropsy progressively increased under the use of quinia and iron, during 10 days. Elaterium and gallic acid were afterward used. Recovery in this case.

CASE XII.—In this case, after dropsy had disappeared under the use of the acetate of potassa, the potassio-tartrate of iron was given until recovery.

CASE XIII.—The dropsy, in this case, having disappeared under the use of the pulvis purgans and the hot-air bath, quinia and iron were given until recovery.

CASE XIV.—Tonics, the remedies not specified, were given in this case after the disappearance of dropsy under the use of diuretics. Recovery in this case.

CASE XV.—This case came under observation three and a half months after the commencement of the disease, pericarditis having occurred, from which he had recovered. The urine was albuminous, and there was some anasarca. Recovery took place under the use of the tincture of the chloride of iron.

CASE XVI.—Much dropsy existed in this case, which disappeared under the use of purgatives, the particular purgative remedies not being specified. Tonics, the remedies not specified, were then used until recovery.

In addition to the use of diuretics, cathartics, the hot-air or vapor bath, gallic acid, and tonics, the histories in this collection of cases contain very little which is noteworthy. It is noted in one case that uræmic coma followed directly the arrest of vomiting by suppositories of morphia. This case proved fatal, and the kidneys were contracted. *Per contra*, in another case the patient had acquired the habit of taking opium largely to relieve vomiting and diarrhœa, and she was accustomed to take an ounce of McMunn's elixir of opium daily. There was much anasarca in this case, and the urine was loaded with albumen. Two months after this case came under my observation, her condition was not changed. Subsequently this case ended fatally.

Chloroform and the warm bath were used in a case of uræmic convulsions, with no benefit, the case ending fatally, and the convulsions continuing until death. In another case the inhalation of chloroform was resorted to in order to arrest very active delirium which succeeded an attack of convulsions. The patient, a vigorous man, was kept under the influence of the chloroform for several hours. The effect in this case was good; the patient became rational when the use of the chloroform was discontinued, and for a time there was notable improvement. Death took place several months afterward.

Finally, it is noted in one of the cases that the patient entered the hospital with chronic pleurisy and general dropsy, and during five months in hospital he had no medicinal treatment

excepting a palliative for cough and a liniment to the chest. At the end of five months, the pleuritic effusion and the general dropsy had disappeared, but the urine remained albuminous. At this time he was well enough to be employed at out-of-door work at the hospital.

In judging of the efficacy of therapeutical measures in cases of Bright's diseases, an important consideration is not to be lost sight of, namely, an intrinsic tendency to death, or to recovery, or to improvement, irrespective of any therapeutical agencies. How often would uræmic coma and convulsions cease spontaneously, and either recovery or more or less improvement follow? How often would dropsy either disappear or diminish to a greater or less extent, without any measures of treatment? What results would be furnished by an analysis of a series of cases in which hygienic measures were relied upon to the exclusion of therapeutical agencies? These are questions which cannot now be answered; and it is obvious that it must be a long time before the data on which the answers are to rest can be obtained. It is certain that physicians are not warranted in allowing cases to go without therapeutical interference in order to gather materials for the study of the natural history of these diseases. All that can be done is to report cases in which these diseases have received little or no medicinal treatment, owing to circumstances for which physicians are not responsible. An accumulation of such cases is much to be desired, in accordance with a fundamental principle in medicine, namely, that knowledge of the natural history of diseases is the point of departure for the study of therapeutics.

X.—AMPUTATIONS PERFORMED AT BELLEVUE HOSPITAL.

Amputations performed at Bellevue Hospital. Compiled by
F. J. METCALFE, Acting Junior Assistant. March, 1869.

PROF. F. H. HAMILTON, M. D.,

DEAR SIR: I beg to head this Report with an apology and explanation for not presenting more cases. The number of cases reported is very small for the number of years they include; but, owing to the way in which the reports were formerly kept, I have only been able to find these few, which really represent but about one-sixth or one-eighth of the entire number. For a division of amputations, as regards the periods, I have taken a medium between your own classification and that adopted by the Surgeon-General of the United States Army; viz., immediate, or within twelve hours; primary, after twelve, and before the expiration of forty-eight hours; intermediate, after two days, and before the expiration of three weeks; secondary, after three weeks.

Very respectfully,

Your obedient servant,

F. J. METCALFE.

AMPUTATIONS IN CONTINUITY. **FOR ERM.**

NAME.	AGE SEX	DISEASE.	CONTINUANCE.	PERIOD.	DATE OF OPERATION.	POINT OF OPERATION.	OPERATOR.	METHOD.	ANÆSTHETIC.	RESULT.
Thos. Cain.....	45. M.	Epithelioma of the hand.	Began 2 years ago as a wart on his hand.	Secondary.	April 18, '68	Lower third of forearm	Dr. Hamilton...	Circular.	Ether...	Cured, July 4, 1868.
Samuel Langdon.....	25. M.	Comp. fracture of forearm.	Same day.	Immediate or primary.	April 10, '66	Middle 3d of forearm	Dr. Smith.....	Flap.....	Ether...	Cured, May 30, 1866.
Ellen Fitzgerald.....	50. F.	Run over by street car, Sept. 23, '65, crushing left arm, right forearm, and breaking thigh.	6 hours after accident.	Immediate (Both operations).	Sept. 25, '65	3 in. below head of humerus 4 in. above wrist.	Dr. Hamilton...	Double flap.	Ether...	Died on 6th day, Oct. 1, 1865.
Chas. F. Davis.....	47. M.	Fracture of arm.	8 hours...	Immediate.	April 30, '67.	Just below elbow-joint.	Dr. Forman....	Flap.....	Chlo'm.	Cured, May 11, 1867.

A R M.										
A Frenchman....	21. M.	Arm crushed in machinery June, 1864. Gangrene supervened.	6th day...	Intermediate.	June, 1864.	Surgical. Neck of humerus.	Dr. Hamilton...	Flap.....	Ether...	Died on 3d day, having never rallied from effects of ether and operation.
Wm. Horseman....	42. M.	Compound complicated fracture of humerus.	5 hours ✓	Immediate.	March 30, '69	2 in. below neck of humerus.	Dr. Cross.....	Circular.	Ether...	Died, March 31, 1869.
Ann Brakaback.....	4. F.	Compound comminuted fract. of humerus.	6 hours ✓	Immediate.	Aug. 19, '67.	2 in. below shoulder.	Dr. Mott.....	Flap.....	Ether...	Cured, Sept. 15, 1867.
Robt. Widdis.....	10. M.	Compound comminuted fract. of humerus.	Same day. ✓	Immediate or primary.	Aug. 23, '66	Junction of upper and middle 3ds of forearm.	Dr. Johnston...	Flap.....	Ether...	Cured, Oct. 29, 1866.
Peter M. Buchanan...	27. M.	Contusion and laceration of left forearm. Fract. of humerus.	Same day. ✓	Immediate or primary.	April 8, '68.	Middle of humerus.	Dr. Gouley.....	Flap.....	Ether...	Cured.

Cath. Moran.....	27.. F...	Strumous syno- vitis of elbow- joint, with ca- ries, arm.	18 months.	Secondary..	Sept. 29, '66	Middle of humerus.	Dr. Hamilton...	Circular..	Ether...	Cured, Dec. 10, 1866.
Jacob Houlet.....	22.. M..	Laceration of right arm.	4 hours.	Immediate.	Feb. 28, '67.	3 in. below shoulder-joint.	Dr. Sayre.....	Flap.....	Chlo'm.	Died, March 3, 1867.
Francis Devall.....	23.. M..	Compound com- minuted fract. of forearm.	36 hours.	Primary....	March 2, '69	Upper 3d of humerus.	Dr. Mott.....	Flap.....	Ether...	Died of pyæmia.
Jos. Wright.....	8.. M..	Compound fract. of humerus.	Synœ day.	Immediate or primary.	June 22, '67.	Upper 3d of humerus.	Dr. Sayre.....	Flap.....	Chlo'm.	Cured, Sept. 14, 1867.
Tobias Dillon..... (Double amputation.)	24.. M..	Both arms crush- ed by machinery	2 hours.	Immediate.	Nov. 21, '65	Right arm, middle of humerus.	Dr. Hamilton...	Double flap.	Ether...	Died of osteo-myelitis and pyæmia.
W. D.....	28.. M..	Hit on elbow by recoil of Parrott gun, causing ca- ries and necro- sis of joint.	Several months.	Secondary..	Jan. 15, '66.	Left arm, middle of humerus.	Dr. Hamilton...	Double flap.	Ether...	Died.

L E G .

Chas. Ferris..... (Double amputation.)	22.. M..	Fracture of both legs.	10 hours.	Immediate.	May 7, '68..	Left leg at junction of middle and lower 3ds.	Dr. Smith and Dr. Hudson..	Flap.....	Ether...	Died, May 11, 1868.
John Schmidt.....	28.. M..	Elephantiasis of leg.	15 days.	Secondary..	July 31, '66.	Just below knee-joint.	Dr. Sayre.....	Flap.....	Chlo'm.	Died, Aug. 22, 1866.
John Devalay.....	26.. M..	Compound com- minuted fract. of tibia and fibula.	24 hours.	Primary....	Aug. 24, '67.	Just below patella, middle and upper 3ds.	Dr. Wood.....	Flap.....	Ether...	Cured, Dec. 1, 1867.
James O'Hara.....	30.. M..	Crushed by cars.	16 hours.	Primary....	Dec. 26, '63.	Middle of leg.	Dr. Hamilton...	Flap.....	Ether...	Died on 26th day.
James Gillen.....	12.. M..	Run over by street car.	5 hours.	Immediate.	Feb. 6, '64.	Below knee	Dr. Lauderdale.	Double flap.	Ether...	Died on 14th day, of pyæmia.
Chas. Campbell.....	6.. M..	Fracture of tibia and fibula.	10 hours.	Immediate.	Aug. 30, '66.	Middle of leg.	Dr. Johnston...	Flap.....	Ether...	Cured.
Thomas Moran.....	24.. M..	Contusion of leg.	20 hours.	Primary....	Sept. 12, '66	Middle of leg.	Dr. H. L. Smith	Flap.....	Ether...	Died, Sept. 14, 1866.

NAME.	AGE SEX	DISEASE.	CONTINU- ANCE.	PERIOD.	DATE OF OPERATION.	POINT OF OPERATION.	OPERATOR.	METHOD.	ANES- THETIC.	RESULT.
John Morrissey.....	19.. M..	Compound fract. 2 days.... of leg.		Primary.....	Sept. 23, '68	Middle of leg.	Dr. Mott.....	Flap.....	Chlo'm.	Cured, Nov. 14, 1868.
Caroline Carroll.....	35.. F..	Sponaneous gan- 9 days.... grene of leg.		Inter- mediate.	Jan. 23, '69	Lower 3d...	Dr. Wood.....	Flap.....	Nitrous Oxide	Died, Jan. 1, 1869.
Thomas Toley.....	30.. M..	Run over by car. 3 hours....		Immediate..	Sept. 4, '65	Just below knee.	Dr. Hamilton..	Circular..	Ether...	Secondary hemorrhage, Sept. 11. Tied femo- ral artery in Scar- pa's space. Died on 12th day after ampu- tation.
Lewis Morschhausser.	14.. M..	Run over by car. 2 hours....		Immediate..	Sept. 22, '64	Middle of leg.	Dr. Hamilton..	Circular..	Ether...	Complete and rapid recovery.
Gorman boy.....	9.. M..	Run over by car. Soon.....		Immediate..	Sept., 1864.	Leg, below knee.	Dr. Hamilton..	Circular..	Ether...	Dec. 7, 1864, had re- covered with a good stump.
Thomas Flood.....	23.. M..	Railroad accident —carries of tar- sal bones.	4 months.	Secondary..	March 18, '65	4 in. above ankle.	Dr. Hamilton..	Circular..	Ether...	Recovered with a good stump.
John Ward.....	29.. M..	Curles of tarsal bones.	19 years....	Secondary..	March 18, '68	4 in. above ankle.	Dr. Hamilton..	Circular..	Ether...	United mostly by 1st intention;—a good stump.
Wm. Bruin.....	11.. M..	Run over by car. 1 hour....		Immediate..	Aug. 29, '65	3 in. above ankle.	Dr. Hamilton..	Circular..	Ether...	United mostly by 1st intention; recovery complete.
Ann H.....	30.. F..	Epithelioma of heel.	Since childhood	Secondary..	Jan. 13, '66	1½ inches above ankle	Dr. Hamilton..	Circular..	Ether...	Recovery slow, but complete.—See N. Y. Med. Rec., Feb., '66.
Christiana Lissit.....	23.. F..	Compound frac- 7 hours.... ture of leg.		Immediate..	June 4, '68.	Middle of leg.	Dr. Sands.....	Flap.....	Ether...	Died, June 19, 1868.
James Watson..... (Double amputation.)	9.. M..	Laceration of both feet.	17 days....	Secondary..	Jan. 12, '68.	Junction of middle and lower 3ds	Dr. Sands.....	Flap.....	Ether...	Died, Feb. 21, 1869.
Michael Nicholsberry.	56.. M..	Compound frac- 7 hours.... ture of both legs.		Immediate..	Aug. 4, '68.	1 in. below knee-joint	Dr. Pratt.....	Flap.....	Ether...	Cured, Sept. 10, 1868.

T H I G H .

Millieck Tracy.....	27..	M..	Fracture of tibia, fibula, and femur.	Same day.	Immediate or primary.	Aug. 6, '66.	Union of Dr. ——— upper and middle 3ds of femur.	Circular.	Chlo'm.	Died, Aug. 14, 1866.
—	25..	F..	Large popliteal aneurism.		Secondary.	1862.....	Above mid- dle of thigh femur.	Circular.	Ether...	Died after the wound had partly closed.
James Harkins.....	7..	M..	Fracture of tibia and fibula.	Same day.	Immediate or primary.	Nov. 4, '66.	Lower 3d of femur.	Flap.....	Ether...	Cured.
Chas. Crookander....	42..	M..	Compound frac- ture of leg.	31 hours.	Primary....	Oct. 29, '68.	Upper 3d of femur.	Flap.....	Ether...	Cured, Jan., 1869.
Ernest Taruff	2..	M..	Compound frac- ture of tibia and fibula.	5 hours.	Immediate.	May 27, '67.	Middle femur.	Flap.....	Ether...	Cured, July 30, 1867.
Chas. Johnston.....	30..	M..	Compound com- minuted fracture of femur.	3 days....	Inter- mediate.	Nov. 2, '67.	Middle femur.	Flap.....	Ether...	Died, Nov. 5, 1867.
John Frost	45..	M..	Compound com- minuted fracture of leg.	30 hours..	Primary....	Jan. 23, '69.	Upper 3d of femur.	Flap.....	Biehl- Methyl- lene.	Died, Jan. 25, 1869.

AMPUTATIONS IN CONTIGUITY.

W R I S T .

John Smith.....	27..	M..	Gun-shot injury..	10 months	Secondary..	Sept. 16, '67	Wrist-joint.	Dr. Hamilton..	Circular.	None...	Rapid and complete recovery.
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E L B O W .

Ben. Pressly.....	33..	M..	Fracture of fore- arm.	4 hours...	Immediate.	Sept. 7, '67.	Elbow-joint	Dr. White.....	Flap.....	Chlo'm.	Cured, Oct. 20, 1868.
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K N E E .

Michael McDonald...	16..	M..	Fracture of tibia and fibula.	1½ hours.	Immediate.	Aug. 13, '66.	Knee-joint..	Dr. Sands.....	Flap.....	Ether...	Died, Aug. 15, 1866.
Richard Adams	38..	M..	Compound frac- ture of leg.	20 days...	Secondary..	Feb. 16, '69.	Knee-joint..	Dr. Markoe....	Flap.....	Ether...	Cured.
August Waterman....	15..	M..	Compound frac- ture of leg.	6 hours..	Immediate.	Aug. 19, '67.	Knee-joint..	Dr. Mead.....	Flap.....	Chlo'm.	Died, Sept. 25, 1867.

NAME.	AGE SEX	DISEASE.	CONTINUANCE.	PERIOD.	DATE OF OPERATION.	POINT OF OPERATION.	OPERATOR.	METHOD.	ANESTHETIC.	RESULT.
Wm. Rees.....	14.. M.	Compound dislocation of tibia.	Same day.	Immediate or primary.	Sept. 5, '68.	Knee-joint..	Dr. Mott.....	Flap.....	Chlo'm.	Cured, Sept. 30, 1868.
Joseph Irabuck.....	63.. M.	Elephantiasis of leg.	of 15 years..	Secondary..	Dec. 9, '68..	Knee-joint..	Dr. Sayre.....	Flap.....	Ether...	Died, Jan. 15, 1869.
—.....	40.. M.	Leg crushed by street car.	by 1½ hours.	Immediate.	Sept. 25, '64	Knee-joint..	Dr. Hamilton...	Circular..	Ether and brandy	Cured.
Wm. Brophy.....	35.. M.	Run over by car..	15 hours..	Primary....	March 5, '66	Knee-joint..	Dr. Hamilton...	Oval.....	Ether...	Died on 3d day.
Fred. Suford.....	42.. M.	Compound fracture of leg.	7 days....	Secondary..	Jan. 6, '68..	Knee-joint removed, patella and 1½ inch of femur.	Dr. Hamilton...	Oval.....	Ether...	Died on 3d day from septicæmia.—See N. Y. Medical Gazette, Feb. 8, 1868.
HIP-JOINT.										
John Schmidt.....	28.. M.	Chronic osteitis and osteomyelitis.	10 years..	Secondary..	Sept. 22, '66	Hip-joint..	Dr. Hamilton...	Flap.....	Ether...	Died of pyæmia.
REAMPUTATIONS.										
LEG.										
Jas. Clark.....	28.. M.	Reamputation of leg for neuroma, original injury, gunshot.	2 years...	Secondary..	Dec. 9, '67..	6 in. below knee.	Dr. Hamilton...	Circular..	Ether...	Cured, March 24, 1868.
THIGH.										
Wm. Cotter.....	29.. M	Reamputation of femur.	4 days....	Intermediate.	May 30, '68.	Middle femur.	Dr. Hamilton...	Flap.....	Ether...	Cured, Sept. 26, 1868.
Jas. Flynn.....	22.. M	Reamputation of femur.		Secondary..	Nov. 14, '68.	Upper 3d of femur.	Dr. Wood.....	Flap.....	Ether...	Died, Dec. 14, 1868.

SUMMARY OF CASES.

Total number of amputations and reamputations.....	55
Amputations.....	52
Reamputations.....	3
	— 55

Amputations { Died.....	26
{ Cured.....	26
	— 52

Of the fifty-two amputations, thirty-seven were either immediate or primary—that is, within forty-eight hours—of which number seventeen died, and twenty recovered. Three were intermediate, and all died; twelve were secondary, of which number seven died, and five recovered.

Reamputations { Died.....	1
{ Cured.....	2
	— 3 — 55

TOTAL NUMBER OF DEATHS AND CURES.

Died.....	27
Cured.....	28
	— 55

RESULTS IN WHICH ANÆSTHETICS WERE EMPLOYED.

<i>Ether.</i>		<i>Chloroform.</i>		
Cured.....	22	Cured.....	5	Nitrous oxide, died... 1
Died.....	21	Died.....	4	Bichl. methylene, died.. 1
	43		9	No anæsthetic, cured.. 1
				— 3 — 55

AMPUTATIONS IN CONTINUITY.

<i>Forearm.</i>		<i>Arm.</i>		<i>Leg.</i>		<i>Thigh.</i>	
Cured.....	3	Cured.....	5	Cured.....	10	Cured.....	3
Died.....	1	Died.....	6	Died.....	9	Died.....	4
	4		11		19		7
							— 41

AMPUTATIONS IN CONTIGUITY.

<i>Wrist.</i>		<i>Elbow.</i>		<i>Knee.</i>		<i>Hip.</i>	
Cured.....	1	Cured.....	1	Cured.....	3	Cured.....	0
Died.....	0	Died.....	0	Died.....	5	Died.....	1
	1		1		8		1
							— 11

REAMPUTATIONS.

<i>Leg.</i>		<i>Thigh.</i>	
Cured.....	1	Cured.....	1
	— 1	Died.....	—
			2
			— 3 — 55

XI.—REPORT OF CASES OF ANÆSTHESIA.

*Report of 'Cases of Anæsthesia at the Bellevue Hospital',
with the Use of a New Inhaling Apparatus. By D. H.
GOODWILLIE, M. D., D. D. S.*

The following record of cases of anæsthesia in the hospital, in which my inhaling apparatus has been employed, was prepared at the request of Professor Frank H. Hamilton and several members of the Medical Board of the Bellevue Hospital. The peculiar construction of the apparatus, which will be described further on, admits of its adaptation to the inhalation of different anæsthetic vapors, such as the vapor of ether, of chloroform, nitrous oxide gas, bichloride of methylene, etc. Of the fifty instances recorded in the table, in which it was employed, anæsthesia was produced for slight as well as grave operations; and in operations about the mouth and nose the inhaler was used during the operation. As will be seen by the recapitulation at the end of the table, the apparatus was used in both males and females, and at all ages, from fifteen months to fifty-eight years.

DATE. 1867-'08.	SEX	AGE	OPERATION.	OPERATING SURGEON.	TIME OF IN- HALATION.	TIME TO PRODUCE ANÆSTHESIA.	AMOUNT OF ETHER USED.	REMARKS.
Dec. 28...	M.	38.	Amputation of thigh.	Dr. J. R. Wood.	35 minutes.	5 minutes.	1 ounce.	No coughing, struggling, or sickness.
Jan. 1...	M.	40.	Resecting fracture of thigh.	Dr. L. A. Sayre.	15 minutes.	4 minutes.	2½ ounces.	No coughing, struggling, or sickness.
Jan. 4...	M.	4.	Operation for hip-disease.	Dr. L. A. Sayre.	25 minutes.	5 minutes.	½ ounce.	No coughing, struggling, or sickness.
Jan. 6...	M.	38.	Extirpation of eye.	Dr. H. D. Noyes.	16 minutes.	6 minutes.	2½ ounces.	Some coughing, struggling, and sickness.
Jan. 8...	M.	35.	Lithotomy.	Dr. L. A. Sayre.	40 minutes.	5 minutes.	6 ounces.	A little struggling.
Jan. 11...	F.	36.	Resecting old fracture.	Dr. L. A. Sayre.	20 minutes.	6 minutes.	2½ ounces.	No coughing, struggling, or sickness.
Jan. 15...	M.	17.	Anchylolysis of knee.	Dr. L. A. Sayre.	29 minutes.	3 minutes.	2½ ounces.	No coughing, struggling, or sickness.
Jan. 15...	F.	43.	Amputation of foot.	Dr. H. B. Sands.	30 minutes.	2 minutes.	3 ounces.	Some struggling.
Jan. 15...	F.	43.	Cancer of breast.	Dr. H. B. Sands.	31 minutes.	5 minutes.	3 ounces.	No coughing, struggling, or sickness.
Jan. 23...	M.	9.	Amputation of foot.	Dr. H. B. Sands.	25 minutes.	4 minutes.	1½ ounces.	Difficult breathing, from a cold.
Jan. 29...	M.	12.	Perineal section.	Dr. J. R. Wood.	35 minutes.	8 minutes.	1 ounce.	Strong man, tremor strong.
Feb. 5...	M.	10.	Necrosis of tibia.	Dr. H. B. Sands.	15 minutes.	5 minutes.	½ ounce.	No coughing, struggling, or sickness.
Feb. 8...	F.	38.	Prolapsus ani.	Dr. T. M. Markoe.	30 minutes.	4 minutes.	2 ounces.	Sick, but did not stop the operation.
Feb. 12...	M.	51.	Hernia.	Dr. A. B. Mott.	45 minutes.	8 minutes.	3 ounces.	Apnea—some resistance in consequence.
Feb. 15...	M.	46.	Amputation of thigh.	Dr. T. M. Markoe.	23 minutes.	5 minutes.	3½ ounces.	No coughing, struggling, or sickness.
				Dr. J. R. Wood.				When etherized before, in the old way, was quite fatigued; came now quietly under the anæsthesia.
Feb. 19...	M.	10.	Opening abscess.	Dr. L. A. Sayre.	8 minutes.	3 minutes.	1½ ounce.	No coughing, struggling, or sickness.
Feb. 19...	M.	36.	Necrosis of calcaneum.	Dr. T. M. Markoe.	40 minutes.	5 minutes.	3 ounces.	Strong man, great tremor.
Feb. 22...	M.	12.	Operation for hip-disease.	Dr. A. B. Mott.	85 minutes.	5 minutes.	1 ounce.	Slight sickness; did not interrupt operation.
Feb. 27...	M.	—	Removal of tumor.	Dr. L. A. Sayre.	10 minutes.	3 minutes.	½ ounce.	No coughing, struggling, or sickness.
March 1...	M.	47.	Cancer of lip.	Dr. T. M. Markoe.	11 minutes.	7 minutes.	3½ ounces.	Strong man, tremor great.
April 1...	M.	46.	Necrosis of humerus.	Dr. J. R. Wood.	16 minutes.	4 minutes.	2½ ounces.	No coughing, struggling, or sickness.
April 4...	F.	6.	Necrosis of thigh.	Dr. J. R. Wood.	33 minutes.	3 minutes.	1 ounce.	No coughing, struggling, or sickness.
April 4...	M.	12.	Necrosis of inferior maxillary	Dr. J. R. Wood.	15 minutes.	5 minutes.	1½ ounces.	No coughing, struggling, or sickness.
April 4...	M.	39.	Necrosis of arm.	Dr. J. R. Wood.	12 minutes.	5 minutes.	2 ounces.	No coughing, struggling, or sickness.
April 18...	M.	40.	Anchylolysis of wrist.	Dr. J. R. Wood.	15 minutes.	6 minutes.	3 ounces.	No coughing, struggling, or sickness.
May 1...	F.	36.	Plastic operation on cheek.	Dr. F. H. Hamilton.	19 minutes.	3 minutes.	1½ ounces.	Some struggling.
May 2...	M.	38.	Necrosis of skull.	Dr. J. W. S. Gouley.	45 minutes.	3 minutes.	1½ ounces.	No coughing, struggling, or sickness.
May 4...	F.	40.	Tenotomy.	Dr. F. H. Hamilton.	10 minutes.	5 minutes.	1 ounce.	Very strong, intemperate woman.
May 9...	M.	—	Amputation of foot.	Dr. J. W. S. Gouley.	40 minutes.	7 minutes.	1 ounce.	Slight resistance.
May 9...	M.	40.	Amputation of foot.	Dr. J. W. S. Gouley.	35 minutes.	6 minutes.	1 ounce.	Publish of right leg.
				Dr. J. W. S. Gouley.				No coughing, struggling, or sickness.
May 10...	M.	15.	Necrosis of tibia.	Dr. J. W. S. Gouley.	70 minutes.	5 minutes.	4 ounces.	Patient had delirium tremens. Died sixth day after operation; autopsy revealed an abscess of brain; old pericarditis; heart somewhat fatty; no delirium after the operation.
May 20...	M.	13.	Necrosis of tibia.	Dr. J. W. S. Gouley.	39 minutes.	5 minutes.	4 ounces.	No coughing, struggling, or sickness.
							2½ ounces.	Sickness.

May 30.	M. 21.	Tenotomy.	Dr. S. Smith.	12 minutes.	4 minutes.	1 ounce.	No coughing, struggling, or sickness.
May 30.	M. 36.	Necrosis of superior maxillary.	Dr. F. H. Hamilton.	40 minutes.	5 minutes.	2½ ounces.	No coughing, struggling, or sickness.
May 23.	F. 1½.	Contracted fingers.	Dr. F. H. Hamilton.	35 minutes.	1½ minutes.	¾ ounce.	No coughing, struggling, or sickness.
May 23.	M. 39.	Dislocation of thigh.	Dr. F. H. Hamilton.	35 minutes.	8 minutes.	¾ ounce.	No coughing, struggling, or sickness.
May 30.	M. 34.	Recapitulation of thigh.	Dr. F. H. Hamilton.	35 minutes.	5 minutes.	¾ ounce.	No coughing, struggling, or sickness.
June 3.	F. 19.	Amputation of foot.	Dr. F. H. Hamilton.	16 minutes.	6 minutes.	1½ ounces.	Some struggling.
June 27.	M. 19.	Amputation of hand.	Dr. L. A. Sayre.	38 minutes.	4½ minutes.	— ounces.	Patient subject to epileptic fits.
Oct. 10.	M. 53.	Dislocation of shoulder.	Dr. F. H. Hamilton.	10 minutes.	5 minutes.	— ounces.	Bichloride of methylene was used; very good anæsthesia.
Oct. 17.	F. 19.	Necrosis of tibia.	Dr. J. W. S. Gouley.	65 minutes.	6 minutes.	— ounces.	Bichloride of methylene; very favorable.
Oct. 17.	M. 18.	Operation on hip-joint.	Dr. F. H. Hamilton.	15 minutes.	5 minutes.	4 ounces.	No coughing, struggling, or sickness.
Oct. 24.	F. 20.	Rhinoplasty.	Dr. F. H. Hamilton.	35 minutes.	5 minutes.	2 ounces.	No coughing, struggling, or sickness.
Oct. 31.	M. 38.	Necrosis of tibia.	Dr. A. B. Mott.	35 minutes.	— minutes.	3 ounces.	Sick; stomach full of food.
Oct. 31.	M. 26.	Excision of elbow-joint.	Dr. A. B. Mott.	40 minutes.	6 minutes.	¾ ounce.	No coughing, struggling, or sickness.
Oct. 31.	F. 1½.	Contracted muscle of neck.	Dr. F. H. Hamilton.	10 minutes.	2 minutes.	¾ ounce.	No coughing, struggling, or sickness.
July.	F. 40.	Removal of tumor.	Dr. F. H. Hamilton.	15 minutes.	6 minutes.	2½ ounces.	No coughing, struggling, or sickness.
Aug. —.	F. 45.	Extirpation of eye.	Dr. F. H. Hamilton.	40 minutes.	12 minutes.	3½ ounces.	No coughing, struggling, or sickness.

RECAPITULATION.

Thirty-seven males, thirteen females—whole number, fifty.

Maximum age of patient, fifty-eight years; minimum age of patient, fifteen months.

Maximum time of ether-inhalation, seventy minutes; minimum time of ether-inhalation, eight minutes.

Maximum time to produce anæsthesia, twelve minutes; minimum time to produce anæsthesia, one and a half minutes.

Whole amount of ether used, two hundred and fifty-six ounces—minimum amount, one-third of an ounce; maximum amount, six and a half ounces.

Average amount of ether used in the above fifty cases is two ounces and five drachms.

Average time to produce anæsthesia, five minutes and seven seconds.

Average time anæsthesia was kept up for each operation, twenty-seven minutes and twenty-four seconds.

Average age of patients, twenty-eight years and six months.

As an average of the above cases, it appears that two ounces and five drachms of ether would produce anæsthesia in five minutes and one second, and keep it up for twenty-seven minutes and four seconds, in a patient aged twenty-eight years and six months.

DESCRIPTION OF THE INHALING APPARATUS.

- a. Bottle loosely filled with a sponge.
- b. Tube passing through the cork to the centre of the sponge.
- c. Tube to the inhaler.
- A. Facet containing the inhalation and exhalation valves and air-passage.
- C. Face-piece fitting over the mouth and nose (two sizes with a flexible border for children, or for inhalation by either the nose or mouth).



Fig. 2.

EXPLANATION OF THE FACET CONTAINING THE VALVES.

- h. Inhalation-valve for the passage of the vapor.
- f. Exhalation-valve for the breath to pass out.
- j. Passage for the vapor inhaled, and the breath exhaled.
- g. Fresh air-passage, with an index to show the quantities of air or vapor inhaled at any given time.

The relative proportions of vapor and air are changed by the revolution of the facet over the inhalation-valve (h, Fig. 2), and the air-passage (g, Fig. 2). These proportions are shown by the index. Thus, revolving from one to four increases the vapor, and, in the same proportion, decreases the air. The reverse obtains in revolving from four to one. One is the minimum amount of vapor and the maximum amount of air. Four is the maximum of vapor and minimum of air.

When the patient inhales, the air passes into the bottle at b, causing the liquid to vaporize on the upper half of the sponge (the bottle ought never to be filled more than half full with the anæsthetic fluid) to pass out at c into the inhaler, to be taken into the lungs, the amount of vapor or air being

regulated by the revolution of the facet over the inhalation-valve (h) and the air-passage (g), which amount is shown by the index.

The value of the inhaling apparatus, as seen by the record above, is its comparative safety, as air can at all times be inhaled, thus producing anæsthesia without partial asphyxia. As it is under the complete control of the administrator, any degree of anæsthesia can be produced.

The gradual inhalation of the vapor produces less spasm of the glottis, and less coughing, struggling, and sickness. Anæsthesia is thus quietly produced and maintained, and there is a more rapid recovery from the anæsthetic.

There is a great saving of the anæsthetic, as there can be no waste, the vapor passing directly from the bottle to the lungs, and there is little or no smell of the anæsthetic in the room.

It will be observed, from the above report, that very few cases of sickness from the anæsthetic occurred. Had all the patients received attention before the operation, there undoubtedly would have been less sickness. In the operations both on the mouth and nose, the inhaler was used during the operation. In two cases of amputation of the thigh, in which there was very great prostration, nitrous oxide was administered with good success, and neither of the patients suffered any depression from the anæsthetic.

Chloroform, bichloride of methylene, and tetrachloride of carbon, have also been administered with this inhaling apparatus with success.

XII.—PATHOLOGICAL REPORT.

Report of the Pathological Department of Bellevue Hospital. By J. W. SOUTHACK, Jr., M. D., Curator; E. G. JANEWAY, M. D., and FRANCIS DELAFIELD, M. D., Assistant Curators.

IN June, 1866, the pathological department of Bellevue Hospital was reorganized and placed under the supervision of the present staff. Previous to that time there had been but eleven autopsies recorded. In the fifteen months that followed there were recorded two hundred and seventy-seven autopsies. These furnish the data for this, the first report of the pathological department. The cases extend from June 16, 1866 (the date of the opening of the new *post-mortem* room), to October 8, 1867. Especial attention is called to these dates, for, in classifying the various lesions in reference to the months in which they may have occurred, it must be borne in mind that the months from June to October have passed twice.

The following is the classification that has been adopted :

ORDER OF ARRANGEMENT.

- I. Brain and spinal cord, with membranes.
- II. Heart and vessels.
- III. Larynx, trachea, lungs, and appendages.
- IV. Æsophagus and alimentary tract.
- V. Liver and spleen.
- VI. Kidneys.
- VII. Genito-urinary organs.
- VIII. Bones.
- IX. Cholera.

APOPLEXY OF THE BRAIN.

Seven cases of recent extravasation of blood in or on the brain were observed. The *post-mortem* examinations in these cases occurred, one each in June and December, 1866, and in February, April, July, August, and September, 1867. Four of the patients were males, and three females. The ages of the males were as follows: 40, 45, 50, and 60 years; of the females, 22, 29, and 69 years. The average age of the males was $48\frac{1}{4}$ years; of the females, $36\frac{2}{3}$ years.

In three cases the extravasated blood was only found on the surface of the brain. In one case there was conjoined with a superficial extravasation, a clot in the brain, and in another case, softening of the brain.

In one case the extravasation was limited to the brain, and in one case it was ventricular.

Of the first class, in which the extravasation was only on the surface, all were males, in none of whom was there a fracture of the skull.

CASE I.—Age, forty years. There were about four fluid-ounces of blood in the cavity of the arachnoid. The anterior lobes were much depressed on their superior part. The patient had almost general paralysis of the muscles of the extremities, and is said to have been conscious till death. He had been very intemperate. The only lesion, besides the apoplexy, was hypostatic congestion of both lungs.

CASE II.—Age, sixty years. There was a large clot over nearly the whole upper surface of the left half of the cerebrum—a recent fracture of the right cervix femoris and an old one of the left were found associated with the apoplexy. The symptoms of apoplexy came on two days before death, and consisted at first in inability to protrude the tongue, and finally coma. Death occurred three days after the last fracture.

CASE III.—Age, forty years. There was a large clot over nearly the whole superior surface of the brain, and a thin clot over the medulla oblongata. This patient had typhoid symptoms, with severe delirium, for eight days. He had ecchymoses

on the extremities, as if from injury. The only lesion besides the apoplexy was fatty kidney.

CASE IV.—Of the second class, the first was a female, twenty-two years of age. There was considerable clotted blood situated beneath the arachnoid, covering the superior portion of the right hemisphere, and also a large effusion at the base of the brain, compressing the pons and medulla. Two clots were also found in the brain. One was situated in the middle lobe of the left hemisphere, and was the size of a turkey's egg; the other, the size of a pigeon's egg, occupied the posterior lobe of the right hemisphere. Around the former, the brain was much softened. Associated with these lesions, were cardiac hypertrophy, the aortic and mitral valves being thickened and covered with vegetations, and waxy spleen and kidneys, there being also infarctions of these organs. The patient had had acute rheumatism. She died suddenly.

CASE V.—This was a male, forty-five years of age. A clot existed in the cavity of the arachnoid, at the base of either anterior cerebral lobe. These clots were small and partly decolorized. The corpus striatum of left side had almost disappeared, there being a cavity in its interior. The ependyma of the lateral ventricle formed the roof of the cavity, and was perforated by a small opening. This cavity and the left lateral ventricle contained a small amount of opalescent fluid. The brain-substance around the cavity was softened and of a yellowish color. There were associated in this case, pulmonary apoplexy and emphysema, mitral stenosis and thickened aortic valves, with hypertrophy and dilatation of the heart, and fibrous kidneys.

This patient had complete right hemiplegia, of sudden origin, involving motion and sensation, with impairment of intellect, nine months previous to death. The paralysis had improved, but the impairment of intellect remained. The death was preceded by urgent dyspnoea.

CASE VI.—In the case where the extravasation was limited to the brain, the subject was a female, sixty-nine years of age. A clot, the size of a pigeon's egg, was found in the right anterior lobe of the cerebrum, close to the lateral ventricle, and a smaller one in the left optic thalamus. The brain around

each was softened. The arachnoid covering the convex surface of the brain was opaque, and beneath it there was considerable serous effusion. Both lateral ventricles were filled with serum. There was also atheromatous degeneration of the arteries and of the valves of the heart, and Bright's disease of the kidney.

The patient was unconscious for nine days preceding death, and it is stated that she retained power over her limbs for the greater part of this time.

CASE VII.—The case of ventricular apoplexy occurred in a female, twenty-nine years of age. The lateral ventricles were filled with a bloody serum, the third ventricle had a small clot, and the fourth was filled with clotted blood. The arteries were atheromatous. There were also tubercles of the lung and the spleen, and a fatty liver. The kidneys were normal. The patient had puerperal convulsions one day after labor, and died comatose four and a half hours after their first occurrence.

CYST OF THE BRAIN, RESULTING FROM APOPLEXY.

CASE I.—Of the three cases in which a cyst was found in the brain, one was a female, twenty-one years of age. A small cyst, the size of a pea, was situated in the left optic thalamus. The ganglion was smaller than its fellow, and square in shape. Its posterior border was softened, and colored yellowish red. The spleen and all the lymphatic glands were enlarged. The kidneys were fatty. She had right hemiplegia of sudden origin for three years previous to death. Both motion and sensation were affected. She recovered motor power slightly, but sensation was almost completely abolished. Convulsions, epileptiform in character, occurred from time to time. She died comatose.

CASE II.—The second was a male, twenty-six years of age. In this case there was a cyst to the outside of, and slightly involving the corpus striatum, situated in the middle lobe of the right hemisphere. Its size was that of a black walnut. It was lined by a delicate membrane, and crossed by an obliterated vessel. It contained a clear, serous fluid. The tissues around were of a yellowish color, but of normal consistence.

The arteries were atheromatous. There was, in this case, cardiac hypertrophy with mitral regurgitation. The kidneys were fibrous and cystic. Hemiplegia of the left side, affecting motion and sensation, had come on one year previously. The patient died during a convulsion.

CASE III.—The third was a male, aged thirty-five years. At the base of the brain, in the middle lobe of the left side, was a cyst, one and three-fourths inches in diameter. The brain around it was firm and of a brown color. There were adhesions of the arachnoid surfaces to one another at this part, and also considerable subarachnoid serum on the convexity and in the ventricles. The patient died of cholera.

SOFTENING OF THE BRAIN.

Only two cases of this lesion, independent of apoplexy, were observed.

CASE I.—This was in a female, aged sixty-two years. At the superior surface of the left anterior lobe of the cerebrum, was a small cavity, about one inch in diameter, covered by the arachnoid, and having a fold of pia mater dipping into it. It contained serum and softened brain-substance, and was bounded by brain-tissue. Coexisting with this lesion, were the following: hydrothorax, emphysema of the lungs, cardiac hypertrophy, with thickening of, and vegetations on the aortic and mitral valves, fatty liver, and fibrous and cystic kidneys. Delirium preceded death by coma.

CASE II.—The other case was a male, age unknown. The examination was made in October, 1866. There was red softening of the left corpus striatum. The heart was hypertrophied, the aortic valves thickened, and the aorta atheromatous. The kidneys were fibrous. There was also some serum in the pleural cavities. The only thing known of the patient is that he had convulsions a short time before his death. He died comatose.

MENINGITIS.

There were but two cases of acute meningitis.

CASE I.—The first was observed in a female, whose history and age were unknown. The examination occurred in February, 1867. There was, in this case, in addition to the

meningitis, pneumonia with abscesses in the upper lobe of the right lung. Vegetations were found on the aortic valves, and the kidneys were fibrous.

CASE II.—The second case occurred in a male, aged forty-nine years. With the meningitis were associated double pneumonia, slight thickening of the aortic valves, and small bony plates in the capsule of the spleen.

Meningitis of the subacute variety was observed in seven *post-mortem* examinations. The subjects of these examinations were all males, the youngest was twenty-three, and the oldest sixty years of age. The number dying between 20 and 30 years, one; 30 and 40 years, two; 50 and 60 years, three.

The average age was $41\frac{1}{6}$ years. Of the examinations, two occurred in July, and one each, in September, October, and November, 1866, and two in May, 1867. The appearances which have been considered as distinctive of this variety are, slight opacity of the arachnoid, the occurrence of a small amount of fibrinous exudation on the under surface of the arachnoid, with a large amount of serous fluid, both subarachnoid and ventricular.

In these cases the following complications were noted:

In CASE I.—Tuberculosis pulmonalis only.

In CASE II.—Tuberculosis pulmonalis, slight ulceration of the epiglottis, and atheromatous degeneration, with dilatation of the aorta.

In CASE III.—Cirrhosis, and fatty liver, fatty kidneys, old pericardial adhesions, and calcified aortic valves.

In CASE IV.—A small abscess in the anterior mediastinum, fatty kidneys, and necrosis of the iliac bone, with abscess.

In CASE V.—Fibrous kidneys.

In CASE VI.—Here the lesions were numerous, viz.: small bony plates in the arachnoid covering the convexity of the brain, cardiac hypertrophy, with thickening of the aortic and mitral valves, slight cirrhosis of the liver, fatty kidneys, old peritoneal adhesions, calcareous plates in the portal and splenic veins, enlargement of the spleen, and ulceration of the cartilages of the knee-joints, with a purulent fluid in the right knee.

CASE VII. was uncomplicated.

ACUTE HYDROCEPHALUS.

Two cases of this disease were made the subject of examinations.

CASE I.—This was a male, aged twelve years. Besides the characteristic lesion, there was tuberculosis pulmonalis, with a cavity in one lung. The bronchial glands were enlarged, and in some the contents were cheesy, and the intestines presented numerous tubercular ulcers. There were also a few transparent tubercles in the peritonæum over the liver.

CASE II.—This was an infant, under six years of age. In this case there were tubercles in the lungs, liver, and spleen, all of semitransparent, gray, miliary variety.

TUBERCLES OF THE BRAIN.

Tubercles occurring in the brain or its membranes in adult life were observed once, in a female, aged twenty-three years. The examination was made in January, 1867. On the convex surface of the cerebrum on either side of the longitudinal fissure, and over the superior surface of the cerebellum, were a considerable number of soft, yellow masses, varying in size from that of a pin's head to irregular, narrow tumors one-quarter of an inch in their long diameter. They were developed in the pia mater, but extended a short distance into brain. In the right posterior lobe of the cerebrum was a similar mass, near the surface, of the size of a pea. The brain around it was softened. In the right corpus striatum were two similar masses, of the size of a split pea, around which were a few points of apoplectic extravasation. There was considerable serum under the arachnoid. Tubercles were found in the lungs, pleura, liver, kidneys, and spleen. Ulceration of the intestine was also noticed, with enlarged and softened glands in the omentum.

TUMORS IN THE BRAIN.

Tumors of the brain were found in two instances.

CASE I.—*Gummy Tumor*.—A male, aged thirty-nine, died December, 1866. Eighteen months before, the right side became suddenly paralyzed, and he was confined to the bed for

some months. He lost the sight of one eye, and had amblyopia of the other eye on December 5th. Then the pupils were dilated, but acted to light. There was headache, and the pulse was 45, and full, delirium at times, then coma and death supervened, December 18th. The man is said to have given a syphilitic history.

All the organs, except the brain, were normal.

The tumor is situated in the left posterior lobe of the cerebrum. It is of irregular, spherical shape, and measures one and a quarter inches in its greatest diameter. Its upper surface is in contact with the arachnoid, which is thickened. The inferior surface, which is rounded, is situated in the brain-substance, covered by a plexus of vessels, which extend a short distance into its substance. The brain-tissue in contact with it is softened and broken down. The tumor is of firm consistence, and of a white color. This white color is in some places opaque, at others semitransparent. The entire tumor is composed of a mass of granules with a few small, round cells, broken, and fibres here and there. In sections made after hardening, and treated with acetic acid, there is an appearance as if spindle-cells, far advanced in fatty degeneration, were arranged in parallel lines, in a granular basement-membrane. At the upper part of tumor is a portion one-eighth of an inch thick, consisting of bands of fibrous tissue.

CASE II.—*Glio-sarcoma*.—This case occurred in a male, aged thirty-five years. He had chancre fifteen years ago, but no secondary symptoms. Two years ago he was troubled with occasional dizziness, lasting for a minute or so. This would be accompanied by slight twitchings of the limbs. A little later, the left side of face became paralyzed, and remained thus till October, 1866, when he had slight hemiplegia. This soon disappeared. Facial paralysis remained until death. In January he became suddenly blind. Attacks of vertigo increased constantly after admission into the hospital. For three days preceding death he was semi-comatose. He was comatose for ten hours, and died, February 14th.

The brain was the only part allowed to be examined.

There is a tumor embracing the whole thickness of the posterior lobe of the right hemisphere of the cerebrum, of an

irregular ovoid shape, two and a half inches in its greatest diameter. The pia mater and arachnoid covering it are thickened and adherent, and over the superior surface, the dura mater is also adherent.

The tumor is tolerably well defined from the surrounding brain-substance, the latter being broken down into a softened and diffuent mass. This softening embraces, though to a less degree, the whole posterior half of the cerebrum. The tumor is of a yellowish, opaque, white, color, mottled with portions of a grayish color. The white parts are quite firm and resistant, while the grayish portions resemble in consistence, as in color, the gray matter of brain. The grayish portions consist :

1. Of a large number of blood-vessels, for the most part filled with blood.

2. A great number of small cells resembling those found in the neuroglia. They are mostly round or oval, slightly granular, $\frac{1}{3000}$ of an inch in diameter, rather like nuclei than cells. About some of these nuclear cells are small, pale cell-bodies. There are also some cells similar in appearance to these, but larger, the cell-body better defined, measuring $\frac{1}{1800}$ of an inch in diameter and containing a single nucleus, $\frac{1}{4000}$ of an inch in diameter.

3. In hardened sections, that have been brushed out, there is seen a delicate fibrous net-work, in the meshes of which the cells are held. As we pass from the gray to the yellow portions of the tumor, the vessels diminish in number and finally disappear. The cells become fatty, and, in the parts which are quite opaque and yellow, nothing can be seen but a mass of fine granules.

On the inferior surface of the right posterior lobe of the cerebrum, are a number of hæmorrhagic spots.

SOFTENING OF THE SPINAL CORD. ✓

This lesion was observed in two cases.

CASE I.—This was a male, twenty-eight years of age. The cord, from the sixth dorsal vertebra to near its termination, was diffuent and creamy. The arachnoid was adherent to the

dura mater, and this, thickened and vascular, was fused with the posterior common ligament.

There was extensive caries of the bodies and transverse processes of the sixth, seventh, eighth, and ninth dorsal vertebrae, and also of the adjoining ends of the ribs. The body of the seventh vertebra was broken in half, and the fragments projected into the canal, occupying about one-fourth of its calibre. There was, on either side of the vertebral column, corresponding to the sixth, seventh, and eighth vertebrae, an abscess situated beneath the pleura. The lungs were firmly adherent at these points, and only moderately so over the rest of their surface. There were also effete tubercles in the lung, cretaceous and cheesy.

The kidneys and the spleen were waxy.

The legs were flexed on the thighs, and the latter on the abdomen. One thigh was firmly adducted over the abdomen, and the other rested on it. The muscles were contracted, and it was only by their section and by extreme force that the legs could be straightened after death.

In the history of the case, it is stated that the patient had injured himself in lifting. This act was followed by pain in the dorsal region of the spine. Two weeks later, he noticed slight paraplegia affecting motion and sensation. In three months this had become complete. During this time he had reflex movements. Afterward, there were spasmodic movements, flexing the legs on the thighs and the thighs on the abdomen. Gradually the legs became fixed in their position.

CASE II.—This was in a female, thirty-four years of age. The examination was made in October, 1867.

In this case there was white softening of the spinal cord, more marked in the anterior than in the posterior columns. The centre of the softening was opposite the ninth dorsal vertebra; and opposite this point the cord was diffuent. The length of the softened portion was two and a half inches. The only other lesions were crude tubercle of the lungs and cystitis. In this case there was gradually progressing paraplegia of motion and sensation. The legs became contracted and anæsthetic. The duration of the disease was four months. A

short time previous to death, she had an attack of dysentery, from which she recovered, but died of debility induced by it.

PERICARDITIS.

This lesion was found in ten *post-mortem* examinations. They were distributed over the different months, in the following order: one in July, and one in November, 1866; one in January, three in February, one in April, two in May, and one in June, 1867.

Six times it was found in males and four times in females. The youngest was twenty-six, and the oldest, sixty-two years of age.

Death occurred between 25 and 35 years in 3.						
"	"	"	25	"	45	3.
"	"	"	45	"	55	3.
"	"	"	55	"	65	1.

The average age was 42½ years.

The product of the inflammation was, in eight cases, sero-lymph, and in only one case was it of sufficient amount to distend the sac. Once the effusion was bloody, and in another case, purulent.

In two cases there were evidences of a previous inflammation. In five cases the aortic and mitral valves were slightly thickened, and once there was associated, thickening of the tricuspid valves. In three instances this was evidently due to a recent inflammation, while in the other two it had been of some duration.

There were associated with the pericarditis, in several cases, more than one of the attributed causes of the disease. Hence it has appeared better to give the complications in the different cases as follows:

In the first case.—Double pneumonia and pleurisy, fatty kidneys, hepatitis gummosa, and erysipelas of face.

In the second.—Single pneumonia, double pleurisy, and fibrous kidneys.

In the third.—Purulent peritonitis, cirrhosis of liver, fatty kidneys, and pus in one of the knee-joints, with increase of the synovial fluid in the other. This case is the one mentioned as having purulent fluid in the pericardium.

In the fourth.—Empyema (left pleural sac), fibrous kidneys, and cirrhosis of liver.

In the fifth.—Pneumo-hydrothorax on the right side, pleurisy on the left side, with slight serous effusion, and tuberculosis involving the lung, pleura, peritonæum, and kidney.

In the sixth.—Carcinoma of the right kidney, and fibrous degeneration of the left.

In the seventh.—Emphysema of the lungs, and fatty kidneys.

In the eighth.—Emphysema of the lungs, fibrous kidneys, circumscribed softening of the brain, and vegetations on the valves of the left heart.

In the ninth.—Phthisis, pleurisy on the left side, and erysipelas of the face.

In the tenth.—Pneumonia, and fibrous kidneys.

RECENT ENDOCARDITIS.

This affection was only noticed in four cases.

CASE I.—A female, age doubtful. The endocarditis affected the mitral and tricuspid valves. The heart was otherwise normal. The liver and kidneys were fatty.

CASE II.—A female, aged forty. The mitral, tricuspid, and pulmonary valves were affected, the aortic valves being calcified. The heart weighed eighteen oz. and there was recent pericarditis. Hydrothorax, ascites, anasarca, and œdema of the lungs, with a slight pneumonia, and fibrous and cystic kidneys, were the complications.

CASE III.—A female, aged forty-eight. The disease affected only the aortic valves. There coexisted, pericarditis, pleurisy, phthisis, and facial erysipelas.

CASE IV.—A female, aged forty. The disease affected the aortic, mitral, and tricuspid valves. The heart weighed twenty oz. The complications in this case were pericarditis, pneumonia, and fibrous and cystic kidneys, with ascites and œdema of the legs.

VALVULAR LESIONS.

Malformations.—Two cases of malformation were observed. The first was one in which there were four pul-

monic valves. The patient was a male, forty-five years of age, who died of general tuberculosis. In the second, there were two aortic valves. One leaf was as large as two ordinary valves, and at its base a thick band, extending from the valve to the arterial wall, and reaching one-third the height of the valve, divided it into two equal segments. The valves were slightly thickened. The heart was otherwise normal, and weighed eight ounces. The patient was a male, twenty-seven years of age, and died of Bright's disease.

Aortic Valves.—The aortic valves were only once diseased alone to a marked extent. This case will be referred to again, under the head of vegetations. It is the one in which there was a rupture of the valve.

Mitral Valves.—These valves were alone affected in nine cases, six times in females and three times in males. The examinations occurred in the following months, two in July and in November, 1866, and one each in March, April, May, and June, 1867. The age of two of the patients could not be ascertained. Of the remaining seven, the youngest was a male of seventeen; the eldest a female of fifty years. The ages of the other females were respectively, twenty-two, twenty-three, of two, thirty-eight years, and of the remaining male, forty-nine years. The average age of these seven cases is $33\frac{3}{4}$ years. There was marked stenosis of the orifice, due to thickening of the valves and adhesion of their edges, in three cases. In two of these cases the valves were also insufficient. In all of the remaining cases the valves were more or less thickened and insufficient. In but one case was there any calcific change in the valves; and this occurred in the youngest subject, together with marked stenosis of the orifice.

The weight of the heart, in seven of the cases, ranged between 14 and $21\frac{1}{2}$ oz., the average being $17\frac{1}{2}$ oz. Dilatation coexisting with hypertrophy occurred in two cases, affecting the auricles and the right ventricle. In two of the cases there was evidence of an old pericarditis. In one case the pulmonary artery was somewhat dilated, and in this case the valves were much thickened and insufficient.

In three of the cases it was ascertained that there had been previous attacks of acute articular rheumatism.

Complications.—In seven of the nine cases there was serous effusion in some part of the body. In three there were hydrothorax, ascites, anarsarca, and œdema of the lungs. In one, hydro-pericardium coexisted with these. In another there were œdema of the lungs, anasarca, and ascites; while in the remaining two there was merely œdema of the lungs.

The kidneys were fibrous and cystic twice, while in the third case there was no marked change. In the next case they were fatty, and in the remaining cases they were fibrous once, fibrous and fatty once, and waxy once.

Of the cases where there was no dropsical effusion, the kidneys were once the seat of numerous abscesses, and in the other were fibrous.

The lungs were twice affected, in one case, with multiple abscess, and in a second, with pneumonia. The liver was twice much congested, twice fatty, once waxy and fatty, and in one case each, the seat of gummata, cirrhused, and granular.

Infarction of the spleen and kidneys occurred in one case, as did also apoplexy, and an old apoplectic cyst of the brain. The two former lesions were associated with vegetations.

Lesions of the Aortic and Mitral Valves.—These valves were found affected in the same subject in eight examinations. These examinations were distributed in the different months, in the following order: One each in June, July, December, 1866, and in February, April, and July, 1867, and two in January, 1867. Six of the patients were males and two females. The youngest was twenty-five, and the oldest sixty-two years of age. The average age was $45\frac{1}{2}$ years; and excluding the females, aged respectively fifty and sixty-two years, it was $41\frac{1}{2}$.

In two of the cases both valves were thickened, and in one of these there was mitral insufficiency. Twice the mitral valves were thickened, the aortic being calcareous and thickened. Once the mitral valves were calcified, with marked stenosis of the orifice, the aortic being thickened. In the remaining four cases both valves were calcified. In two of these cases there was stenosis of, and insufficiency at the mitral orifice. In two cases there were several small, round perforations of the aortic valves near their free extremity. The calci-

fication was less marked in the females than in the males, and the average age of those in whom it was most marked was much less than that of those in whom it was but slight or did not exist.

The heart was hypertrophied in all of these cases. The heaviest weighed thirty-one and the lightest sixteen oz. The average weight was $21\frac{3}{8}$ oz. for all; $22\frac{5}{8}$ oz. for males, and 17 oz. for females. In two of the cases all of the cavities were dilated. There was recent pericarditis in one case, and in another there were bony plates in the pericardium and adhesion of the pericardial surfaces. In only one of these eight cases is rheumatism mentioned as having occurred previously.

Complications.—In five of the eight cases there was dropsical effusion in some part of the body. Twice it constituted a marked effusion under the arachnoid of the brain, and in one of these, also in the ventricles. Hydrothorax occurred four times, ascites four times, œdema of the lungs twice, anasarca four times. There was an apoplectic effusion in the brain in one case, and a spot of circumscribed softening in another.

Pulmonary apoplexy occurred twice, pneumonia once, and emphysema of the lungs twice.

The liver was fatty in two cases. The kidneys were in three cases fatty, and in five, either fibrous or fibrous and cystic. One of the patients died of cholera.

Lesions of the Aortic, Mitral, and Tricuspid Valves.—These valves were simultaneously affected in four cases. The examinations were distributed over the following months: one in December, 1866, and in January, August, and October, 1867. Three were males and one was a female. The latter was the youngest, being twenty-three years of age. The age of one of the males was unknown; and that of the two others was, respectively, fifty and sixty-seven years. There was thickening of the valves in all of these cases, twice associated with tricuspid and mitral insufficiency. In these two cases all the cavities were dilated, and the heart itself was hypertrophied. One weighed twenty-seven and the other twenty-one oz. In the first case there had been previous rheumatism, the pericardium was adherent over the whole heart, and pneumonia and fatty liver and kidneys coexisted. The dropsical effusion was

limited to anasarca and ascites. In the second there was emphysema of the lungs, fatty and cirrhotic liver, and fatty kidneys, with subarachnoid serum, hydrothorax, ascites, and anasarca. The aorta was atheromatous and uniformly dilated. The two others will be already referred to under the head of vegetations: one, thirteen oz. in weight, had vegetations on the aortic and mitral valves, associated with infarctions of the spleen, and peritonitis. The other weighed fifteen oz., and presented vegetations on the aortic and mitral valves, these valves being insufficient at both orifices.

Lesions of the Aortic and Pulmonary Valves.—These valves were found thin and fenestrated in two female patients who had died of cholera. Each was thirty-five years of age, and had no other cardiac lesion.

There was but one other case in which these valves were simultaneously affected; viz., in a male, aged forty-eight years. The aortic valves were thickened and rigid, and one leaf of the pulmonary valves had a small round rupture. Both ventricles were dilated, the left more than the right. Pleurisy, pneumonia, pulmonary apoplexy, and emphysema of the lung co-existed in this case. The kidneys were fatty. The pneumonia was of the circumscribed form. With these there was considerable serum beneath the arachnoid and in the ventricles of the brain.

VEGETATIONS ON THE VALVES OF THE HEART.

Vegetations were found on the valves of the heart, fourteen times; ten times in males, and four in females.

They occurred between the age of 20 and 30 years 4 times.

"	"	30	"	40	"	3	"
"	"	40	"	50	"	3	"
"	"	50	"	60	"	2	"

At 62 years in 1 case.

They existed on the mitral valves alone three times, and on the aortic valves alone six times; while in five instances they occurred on both the aortic and mitral, and in one of these cases also were attached to the wall of the left auricle. Only three times did they attain a large size, twice at the aortic orifice, and once at the mitral. This latter was, however,

more of a heart-clot than a true vegetation, and was attached to one of the chordæ tendinæ. Three times they existed independently of any valvular lesion.

In the first of these cases, they were associated with dysenteric ulcers in the colon; in the second, with pneumonia and abscess of the lung, and acute meningitis; and in the third, with fibrous and cystic kidneys. In two of the cases, where they were coexistent with valvular lesions, they were attached to the aortic valves, while the disease affected the mitral; there being in one case a marked stenosis, and in the other, somewhat shortened, thickened, and insufficient valves. In all the other cases they were associated with thickened, and in two instances, also with calcified valves. In one instance the vegetations were due to a rupture of one leaf of the aortic valves, these being thickened, and having attained such a size as almost to occlude the openings. There were also a few vegetations on the mitral valves. Six times the heart was hypertrophied, but, with one exception, there were other causes to account for the enlargement. In the exceptional case the vegetations were sufficient in amount almost to block up the aortic orifice, rough, evidently of long duration, and growing from valves slightly thickened. The heart weighed one lb. ten oz. Coexistent in this case there was an enlarged spleen, which displaced the heart in an upward direction somewhat to the right. During life the diagnosis in this case had been aneurism of the arch of aorta, as there was dulness, impulse, and a double murmur situated at the second costal cartilage on the right side.

The following lesions of other organs were found in these cases, and have probably some relations to them :

Abscess of the thyroid gland, one; pneumonia, one; pneumonia and abscess of the lung, one; acute meningitis, one; apoplexy, two; circumscribed softening of the brain, one; bloody serum, subarachnoid, two; hæmorrhagic spots, lung, one; of intestine, one; infarctus of the spleen, four; cicatrix in the spleen, one; infarctus of the kidney, two; peritonitis, one. In this case the peritonitis was due to the rupture of a dirty, sloughy-looking cavity in the spleen, which was associated with other evidences of infarction.

The following diseases were also noticed in these cases :

Three times the kidneys were fatty, and three times waxy. The liver was twice fatty, and twice it and the spleen were waxy. Tuberculosis pulmonalis existed in two cases. Inter-mittent and remittent fever existed each in one case at the time of death. Rheumatism had occurred previously in three of the cases.

VASCULAR POLYPUS OF THE HEART.

The following case of polypus of the heart it seems best also to describe in this connection :

Mr. —, aged about thirty-five years, was picked up in an apparently intoxicated state, in the street, December 29, 1866. He died in the station-house, at 10 P. M.

Autopsy by Dr. Wooster Beach, Jr. The body was well formed and well nourished. The brain and its membranes were normal.

Heart.—The pericardium was distended by fluid to such an extent as to occupy a large portion of the thorax. There was also a large amount of recent inflammatory exudation over the whole pericardium. The left auricle and mitral valves were normal ; the left ventricle normal ; and the aortic valves, slightly atheromatous. In both there was a moderate amount of dark, coagulated blood. The right ventricle was much enlarged ; the pulmonary valves, normal. The auricular ventricular orifice was very large ; and the tricuspid valves, rough and thickened, were folded back against the ventricular wall, and adherent. The right auricle was much enlarged. Attached to its inner surface, about half an inch from the auriculo-ventricular opening, were two polypi. One, of nearly spherical form, two and a half inches in its greatest diameter, with a very small pedicle, was formed of yellowish, translucent, elastic tissue, with one or two spots of calcareous degeneration. It was entirely contained in the auricle. The second, situated close to the first, was three and a half inches long, of ovoid shape, mostly calcareous, with the lower end broken and rugged, and looking as if pieces had been broken off from it. Its lower end protruded through the auriculo-ventricular opening into the ventricle. On the surface of both, when fresh, vessels filled

with blood were seen by the naked eye by many observers. From the outer surface, a thin membrane could be dissected up, consisting of a delicate lace-work of fibres, with a few spindle-cells. The mass of the tumors consisted of blood-vessels, some still containing blood, and cells, spindle-shaped, star-shaped, round, and oval, $\frac{1}{3000}$ of an inch in diameter, most of the cells slightly fatty; fibres, in broad bands; and a transparent, homogeneous, finely granular basement-membrane. The calcareous portions, on the addition of sulphuric acid, gave off bubbles of gas, and presented acicular crystals. One of the branches of the pulmonary artery was plugged up by a calcareous mass. The artery was thinned, as if the mass had been there for some time.

Lungs.—The lungs were adherent to the pericardium and costal pleura; otherwise they were normal.

Kidneys.—These were fatty.

Liver.—This organ was in an advanced stage of cirrhosis.

ANEURISM OF THE HEART.

One case of this lesion was observed. It occurred in a male, fifty years of age. He had complained of vomiting, debility, and dyspnoea, for seven months previous to his death. He had also oedema of the legs, without albuminous urine or casts. Later in the history of the case, congestion and oedema of the lungs were developed. The heart was enlarged, and there was a systolic murmur at the apex. The patient died comatose, two days after admission, having been in that condition six hours.

The autopsy was made November 7, 1866.

There was opacity of the arachnoid, with a large amount of subarachnoid and ventricular serous effusion. The brain was normal. The lungs were somewhat congested. The left lung was pushed back by the enlarged heart, and was firmly adherent to the pericardium and the thoracic wall. Otherwise the lungs were normal. The pericardium was adherent to the heart over its whole surface. The heart was enlarged, its walls thickened, and its cavities somewhat dilated, more markedly in the left ventricle. An aneurism, about the size of a man's fist, existed at the outer and upper part of the left heart. It was

placed against the outer wall of the left ventricle and auricle, and extended downward to within two inches of the apex, and upward so as to be above the summit of the auricle. The communication with the heart was situated in the outer wall of the left ventricle, one inch from the septum ventriculosum, three-quarters of an inch below the aortic valves, and just to the outer side of the chordæ tendineæ going from the anterior papillary muscle. The opening was $1\frac{1}{4}$ inches long, by half an inch wide, its direction being downward and backward, and its posterior half obstructed by the chordæ tendineæ and the extremities of the muscoli papillaries above mentioned.

The walls of the aneurism were one-eighth of an inch thick, and were composed of laminated fibrin and fibrous tissue. It was covered by adherent pericardium. The mitral and aortic valves were slightly thickened. The aorta was uniformly dilated and markedly atheromatous.

The liver was much congested, of the appearance described as nutmeg.

The kidneys weighed $9\frac{1}{2}$ oz., and did not appear diseased.

AORTIC ANEURISMS. *5 cases,*

Sacculated aneurism of the aorta was found in five cases. In one case there were two aneurisms—one of the thoracic, the other of the abdominal aorta. Only one of these six was of the true variety. The rest were consecutive. These cases were as follows :

CASE I.—Male, aged forty-five. There were two aneurismal tumors. The first, situated on the descending thoracic aorta, was round, three inches in diameter, and reached from the seventh to the ninth dorsal vertebra, inclusive. It had considerably eroded the bodies of the eighth and ninth vertebræ. It communicated with the aorta by an opening in its posterior wall, the size of the end of the finger. The second was a very large tumor which occupied a great part of the left side of the abdomen, measuring thirteen inches in length, seven and a half in width, and five in thickness. Its apex extended to the ninth rib, and its base was at the pelvis. It had eroded the bodies of the eleventh and twelfth dorsal, and the first, second, and third lumbar vertebræ. The communication with the

aorta was by an opening in the posterior wall of the vessel, one and a half inches long, and about three-eighths of an inch wide. It was situated opposite to the point of origin of the celiac axis.

CASE II.—Male, aged thirty-seven years. In this case the aneurism formed a large tumor situated partly within and partly without the chest, on the right side. The aorta was enormously dilated from its origin to the innominate artery. The tumor within the chest measured twenty inches in circumference. Outside of chest it was twenty-five inches in circumference at its base. The portion outside of the chest formed a flattened conical projection, occupying the right mammary region. The third and fourth ribs were completely absorbed for four inches, commencing a little back of their cartilages. The direction of the tumor was outward and to the right. The heart was normal, and was displaced to the left. The right lung was so compressed as to sink in water. The left lung was normal, with the exception of a slight hepatisation at the apex. The trachea was merely displaced to the left. The liver and kidneys were fatty.

This aneurism was ascribed by the patient to an injury produced by a bale of cotton falling on his back. The aneurism involved the whole ascending arch, but was principally marked at the point of pericardial attachment.

CASE III.—Female, aged twenty-six years. This was an aneurismal tumor of the size of a large orange, situated a little to the left of the median line, and extending upward and backward. It involved the whole of the transverse arch, and was firmly adherent to the vertebræ. The left lung was pushed back. The only compression was exerted on the pulmonary artery, a little above its origin. It would admit the little finger with difficulty. The left pneumogastric nerve was embedded in the tumor. The liver was fatty, and the kidneys fibrous. The legs were œdematous.

CASE IV.—Male, aged sixty-three years. This was a true, fusiform dilatation of the aorta, reaching from one inch above its origin to the termination of the transverse arch, was of size of a man's fist. The aorta was very atheromatous. The pericardium was adherent, with bony plates developed in it.

Adhesions of peritoneal surfaces and small bony plates in the capsule of the liver and spleen also existed. The kidneys were fibrous and fatty. Death was the result of œdema of the lungs. The patient had acute rheumatism three years before.

CASE V.—Male, aged thirty-four years. This aneurism was situated in the abdomen. It extended from the eleventh dorsal to the third lumbar vertebræ, and there was also a large secondary tumor on either side of the spinal column. On the right side, it was covered by the psoas muscle, and had for its posterior wall, the vertebræ. On the left side, at its lower part, it had developed itself in the psoas muscle. Its length was four inches, by three in width on either side, and three and a half inches long on the vertebral column. The bodies of last dorsal and first and second lumbar vertebræ were partially eroded, but the intervertebral cartilages were intact. At its upper part it was covered on either side by the diaphragm, and on the right side a rupture had taken place into the right pleural sac, capable of admitting two fingers, and through this the blood had been discharged, completely filling the sac. The communication with the aorta was in its posterior wall. It was round, and half an inch in diameter. This opening was situated just above the point of origin of the celiac axis. All the other organs were healthy. There was merely a slight deposit of atheroma in aorta just above the aneurism, and none elsewhere. The liver in this case was pressed downward and forward.

RUPTURE OF THE AORTA.

This accident was observed in one case, viz.:

A female, apparently about forty-five years, who was found dead in the street, with bruises on her legs and thighs. The aorta was ruptured transversely for one-half of its circumference, just above the valves. The pericardium was torn over the anterior surface of the heart, from the apex to the base. The left pleural sac was nearly full of blood and clots. The aorta was atheromatous, and the kidneys were far advanced in fatty degeneration.

LARYNX AND TRACHEA.

There are four cases recorded of ulceration of the larynx. In three of these cases the patient died with pulmonary phthisis. There were ulcers on the epiglottis and larynx, with thickening of the chordæ vocales, and in one case there were also ulcers in the trachea.

The other case occurred in a female presenting symptoms of constitutional syphilis. The epiglottis, chordæ vocales, and nearly the entire internal surface of the larynx, were the seat of extensive ulcerative and inflammatory processes, so that the parts were completely deformed.

There is one case recorded of ulceration of the trachea alone. It occurred in a female, twenty-one years old, who died with pulmonary phthisis. The ulcers were small, round, their edges sharply marked, and were found from just below the larynx, down to the commencement of the bronchi.

There is one case of abscess in the thyroid body. It occurred in a female, twenty-three years old, who suffered from extensive disease of the aortic and mitral valves of the heart, with Bright's disease of the kidneys, and died with œdema of both lungs and both pleural cavities nearly full of serum. Ten days before her death a tumor was noticed over the trachea and just above the notch of the sternum. This tumor was painful, tender, and appeared to seriously embarrass respiration. It gradually increased in size up to the time of her death. She died with all the symptoms of impeded respiration. After death, besides the lesions of the heart, kidneys, and lungs mentioned above, the thyroid body was found enlarged to the size of a child's fist, and in it was an abscess containing rather more than four ounces of fluid pus.

LUNGS—PNEUMONIA.

There are recorded forty-five cases of pneumonia. Of these, twenty-six were in males, nineteen in females. Thirteen cases were in persons under thirty years old; fourteen cases in persons between thirty and forty; twelve cases in persons between forty and fifty; four cases in persons between fifty and sixty; two cases in persons between sixty and seventy. Six-

teen cases occurred during the winter months; sixteen cases during the spring months; six cases during the summer months; and seven cases during the autumn months. There are ten cases of pneumonia affecting both lungs, all between the ages of nineteen and forty-eight. Of these ten cases, in five the entire right lung, in four the entire left lung, and in one the lower lobe of each lung, was hepatized. In eight of the cases the hepatization was both of the red and gray varieties, and in two cases it was only of the red variety. Of these two cases, one was in a woman, twenty-two years old, who died of puerperal peritonitis, with red hepatization of the lower lobes of both lungs and an effusion of purulent serum in both pleural cavities. The other was in a boy of nineteen, who died with purpura hæmorrhagica, pericarditis, and red hepatization of portions of the upper and middle lobes of the right lung, and of nearly the entire upper and lower lobes of the left lung, the hepatization being of a much darker-red color than is usual. In all the cases there were fresh lymph on the pleural surfaces of the lungs and variable amounts of serum in the pleural cavities. In two cases there was advanced Bright's disease of the kidneys. In one case there was marked emphysema of both lungs, and two small pulmonary apoplexies in the lower part of the upper lobe of the right lung, surrounded by the hepatized structure. In one case there were a number of small, circumscribed, cheesy infiltrations of the upper lobe of the left lung. This lobe was not affected by the pneumonia.

There are twenty-seven cases recorded of pneumonia affecting a single lung. Of these, seventeen occurred in the right lung, and ten in the left lung. Of the seventeen cases in which the right lung was affected, in seven the upper lobe alone, in two the lower lobe alone, and in eight all of the lobes, were involved.

Of the seven cases in which the upper lobe alone was involved, in five there was both red and gray hepatization, and in two, red hepatization alone. Of the two latter cases, one was in a man, thirty-four years old, who presented the lesions of pericarditis, double pleurisy, and hepatitis gummosa; and the other was in a man, thirty-five years old, who presented

the lesions of double pleurisy and Bright's disease of kidney. Of the five cases in which both red and gray hepatization existed, all exhibited recent pleuritic exudation; one case died of cholera; three cases had Bright's disease; one case presented insufficiency of the mitral valves; one case, pericarditis; and one case, acute meningitis, and in the hepatized lung, four small cavities from one-fourth of an inch to one and a half inches in diameter, some containing pus, some a gangrenous, shreddy material; but no tubercles were present.

Of the two cases in which the right lower lobe alone was affected, in one there was red hepatization alone, in the other, red and gray hepatization. The former was in a woman, thirty years old, who died of puerperal peritonitis; and the latter was in a man, fifty-five years old, who also exhibited the lesions of vesicular emphysema, calcification of the aortic valves and hypertrophy of the heart, and cystic disease of the kidneys.

Of the eight cases in which all the lobes of the right lung were affected, in all both red and gray hepatization were found. In three of the cases the upper lobe was gray, while the middle and lower lobes were red; in one case the middle lower lobes were gray, while the upper lobe was red; and in the other four cases both red and gray hepatization were found in each of the lobes. In two of these cases there was a fatty liver and fatty kidneys; in one, fatty kidneys; in one, calcification of the aortic valves; in one, remittent fever; and in two, old cheesy, tubercular deposits at the apex of the lung.

Of the ten cases in which the left lung was affected, in three the upper lobe alone, in four the lower lobe alone, and in three both the lobes, were involved.

Of the three cases in which the upper lobe was affected, in all there were both red and gray hepatization and recent pleurisy. In one case hypertrophy of the heart and Bright's disease were present.

Of the four cases in which the lower lobe alone was affected, in two there was red hepatization alone, and in two, both red and gray hepatization. Of the two former, in one there were present, also, vesicular emphysema and Bright's disease, and in the other, acute peritonitis. Of the two latter, in one there were aortic and mitral insufficiency, fatty liver and fatty

kidneys; and in the other there were œdema of the lungs, cirrhosis of the liver, and Bright's disease.

Of the three cases in which both the lobes of the left lung were affected, one was in a woman, twenty-eight years old, who died of metro-peritonitis after child-birth, the entire lung being in a condition of red hepatization. One was in a man, twenty-nine years old, who died with vesicular emphysema of the lungs and waxy degeneration of the liver and kidneys. The entire upper and part of the lower lobe were in state of red hepatization, the color was unusually bright, and the cut surface very smooth and more granular. Microscopical examination showed the air-cells filled with the usual corpuscles. The third case was in a woman, forty-five years old; and here, also, the entire upper and part of the lower lobe were in a state of red hepatization. Old, cheesy, tubercular deposits were found at the apex of the right lung.

Lobular pneumonia has occurred in eight cases, all of them adults. The cases were as follows:

CASE I.—A woman, fifty years old, who died with the symptoms of pyæmia, had insufficiency of the mitral valves, abscesses in the subcutaneous cellular tissue in various parts of the body, double pleurisy with serous effusion, infarction of both kidneys, and circumscribed spots of pneumonic infiltration, some yellow and cheesy, and some softened in their centres, scattered through both lungs.

CASE II.—A man, twenty-four years old, had gangrene of both feet after exposure to severe cold. The lower lobe of the right lung was hepatized (red), and in the upper lobe of the left lung are four small, circumscribed pneumonic infiltrations, their centres softened.

CASE III.—A woman, fifty years old, in whom a portion of the ilium was necrosed and surrounded by an abscess of some size, the abscess passing through the obturator foramen a short distance down the thigh. There was thrombosis of the internal iliac vein extending up and into the common iliac vein. Circumscribed spots of yellow pneumonic infiltration, some of them softened, were scattered through both lungs.

CASE IV.—A man, forty years old, having a recent fracture of the humerus, acute peritonitis, infarctions of both kidneys,

pleurisy with serous effusion on both sides, and circumscribed pneumonic infiltrations, some cheesy, some softened, in the upper lobes of both lungs.

CASE V.—A man, forty years old, having an abscess over the lower part of the scapula, infarction of the spleen and kidneys, and circumscribed pneumonic infiltrations, with white centres and dark-red edges, in both lungs.

CASE VI.—A man, sixty-two years old, having Bright's disease of the kidneys, red hepatization of the lower lobe of the right lung and in the upper lobes of both lungs, a number of small cavities the size of a chestnut, containing a white, puriform fluid, and surrounded by indurated lung-tissue. There were no tubercles, gray or yellow, in either lung.

CASE VII.—A man, thirty-two years old, who died of acute dysentery and peritonitis. Throughout both his lungs were numerous small spots of lobular pneumonia, showing all the gradations from red to cheesy hepatization. More of them were softened.

CASE VIII.—A man twenty-seven years old, with aortic insufficiency, Bright's disease, a large abscess in the cellular tissue surrounding one kidney, serous effusion in both pleural cavities, gray miliary tubercles in both visceral and costal pleura, and in the upper lobe of the left lung and all the lobes of the right lung, circumscribed, cheesy, pneumonic infiltrations, more of them softened. There were no gray or yellow tubercles of the lungs.

PLEURISY.

Exclusive of cases of phthisis pulmonalis, old pleuritic adhesions were observed in thirty cases, seven times on the left side alone, eleven times on the right side alone, and twelve times on both sides. They occurred in persons dying of diseases having no connection with the pleuritic lesions. The coexistence of Bright's disease of the kidneys was observed in eleven cases.

Recent pleurisy, not accompanying pneumonia or phthisis, occurred in six cases, twice on the left side alone, twice on the right side alone, and twice on both sides. In five of the cases there was Bright's disease of the kidneys; in one case, acute

pericarditis, in one, acute peritonitis, and in one, pulmonary apoplexies in both lungs. In two of the cases the pleural cavity was nearly filled with serum, so as to compress the lung against the spine. Empyema occurred in three cases, twice on the left side, and once on the right side. In one case there were pointing and escape of the fluid at a point between the sixth and seventh ribs. This case was complicated with pericarditis, cirrhosis of the liver, and fibrous degeneration of the kidneys. In the second case it was complicated with waxy degeneration of the liver and spleen, and Bright's disease. In the third case the empyema was subsequent to a pneumonia on the same side, and was complicated with pericarditis.

GANGRENE.

Gangrene of the lung occurred in two cases. One case was in a man, forty years old, in whom nearly the entire upper lobe of the left lung was gangrenous. There was no disease of any other part of either lung, and no complications, excepting atheromatous thickening of the aortic and mitral valves.

The other case was in a man, forty-three years old, in whom nearly all the lower, the middle, and part of the upper lobes of the right lung were gangrenous. Around the gangrenous lung, in the lower lobe, there was some gray pneumonic hepatization of the lung-tissue, and on the same side, the pleural cavity was full of a reddish, offensive fluid. Part of the lower lobe of the left lung was in a condition of red hepatization, and there was fatty degeneration of the liver and kidneys.

PULMONARY APOPLEXY.

Pulmonary apoplexy occurred in two cases. One was in a man, twenty-five years old, in whom there were hypertrophy of the heart, calcareous degeneration of the aortic and mitral valves, cirrhosis of the liver, and fatty kidneys. There were several small apoplectic clots in all the lobes of the right lung, but only two in the left lung; and in both pleural cavities were serum and fresh lymph.

The other case was in a man, forty years old, in whom there was atheroma of the arch of the aorta and Bright's disease of the kidneys. Both lungs were emphysematous, and

there was pneumonic consolidation of both lungs. In the upper lobe of the right lung were two small apoplectic clots surrounded by hepatized lung.

CARCINOMA.

Carcinoma of the lungs occurred in two cases. One was in a man, fifty-one years old, who died with carcinoma of the stomach and liver. There were numerous small, whitish, cancerous nodules scattered over both lungs, most of them in the lung-tissue just beneath the pleura. The other case was in a woman, thirty-one years old, in whom the superior maxilla had been removed for cancerous disease. The tumor had returned at the place of removal, and had been followed by infection of the cervical glands, liver, spleen, kidneys, and lungs. In the lungs it was in the form of small, white nodules, situated just under the pleura.

EMPHYSEMA.

Vesicular emphysema of the lungs was observed in twenty-seven cases, seventeen males and ten females. Four cases were in persons between twenty and thirty years of age; ten cases between thirty and forty; seven between forty and fifty; three between fifty and sixty; and three between sixty and seventy. In five cases it occurred in the right lung alone, in two cases, in the left lung alone, and in twenty cases, in both. The degree of the emphysema varied in different cases; in some the air-cells were only slightly dilated, in others they were very large. In general, it was not confined to any particular lobe, but involved the entire lung. The lower lobes were those in which the dilatation of the air-cells was usually the greatest.

In twelve cases it was accompanied by cardiac lesions. In two cases the aortic valves alone, in three cases the mitral valves alone, and in four cases both aortic and mitral valves, were the seat of the disease. In three cases there was simple hypertrophy of the heart. In seven cases it was accompanied by phthisis pulmonalis, and in five of these the tubercular lesions were quite advanced. In twelve cases there was Bright's disease of the kidneys; in two cases waxy degeneration of the liver; in two cases syphilitic gummy tumors of the

liver; in two cases cirrhosis of the liver; in one case aneurism of the arch of the aorta; in one case aneurism of the abdominal aorta; in five cases pneumonic consolidation; and in one case gangrene of the lung.

PULMONARY PHTHISIS.

Pulmonary phthisis occurred in seventy-nine cases—forty in males, thirty-nine in females. The deaths occurred at the following ages: Below twenty, nine; between twenty and thirty, twenty-eight; between thirty and forty, twenty; between forty and fifty, thirteen; between fifty and sixty, seven; between sixty and seventy, two.

There were fifteen cases of acute miliary tuberculosis, six in young children, and nine in adults, one of these, a man sixty years old. In all these cases but one, the tubercles were scattered throughout all the lobes of both lungs. In this one case, a woman, thirty-four years old, with cystitis, suppurative nephritis, and œdema of the lungs, there were gray miliary tubercles in the two upper lobes only, and no tubercle in any other organs.

The tubercles, in all the cases, were in the form of small nodules, scattered singly or aggregated into somewhat larger nodules, the smallest, gray and semitransparent, the larger, with opaque yellow centres. In four of the cases there existed also the lesions of chronic phthisis, cavities, and yellow, cheesy consolidation of the lung-tissue. In these fifteen cases, tuberculosis of other organs occurred as follows: Pia mater, five times; brain, twice; ulcer of epiglottis, once; pleura (costal), twice; liver, five times; spleen, seven times; kidneys, three times; intestines (with ulceration), four times; peritonæum, once; Fallopian tubes and uterine mucous membrane, once.

Of the seventy-nine cases, sixteen were cases of old deposits in the apices of the lungs, which had become cheesy, or calcareous, or fibrous. In six cases they were in the right apex alone, in four cases in the left apex alone, and in six cases in both apices. They occurred in persons who died of the following diseases: of cholera, four; of dysentery, two; of pneumonia, two; of cirrhosis and Bright's disease, two; of fatty liver and

Bright's disease, two ; of syphilitic gummy tumors of the liver and spleen, and waxy degeneration of the kidneys, one ; of injury, one ; of carcinoma of the stomach, one ; of puerperal convulsions, one. In all the cases there were lesions of the kidneys, either fatty, fibrous, cystic, or waxy.

There were thirty-one cases in which the yellow consolidation of the lung known as "infiltrated tubercles," or "tubercular pneumonia," or "cheesy hepatization," was the predominant lesion, there being very few gray or isolated yellow tubercles. That is, in larger or smaller lobules of the lung there were yellow masses, which, on microscopic examination, were found to be caused by the filling of the air-cells with granular matter, and small, deformed, shrivelled cells. In one case only the upper lobe of the right lung was involved ; and in all the other cases all the lobes of both lungs were, in some measure, implicated. In twenty-four of the cases there were one or more cavities. Around many of the cavities the lung-tissue was indurated, and the fibrous tissue between the air-cells much increased in quantity. Tubercular lesions of other organs occurred as follows: Ulceration of the larynx, three cases ; tubercles in the pleura, two cases ; in the capsule of the liver, one case ; in the spleen, one case ; in the peritonæum, three cases ; in the kidneys, four cases ; in the intestines (ulcerations), twelve cases ; in the Fallopian tubes, two cases. In two of the cases there was hydro-pneumothorax ; in one, emphysema ; in ten, fatty degeneration of the liver ; in two, waxy degeneration of the liver and spleen ; in four, cirrhosis of the liver ; in fifteen, fatty degeneration of the kidneys ; in two, fibrous degeneration of the kidneys. Waxy degeneration of the vessels of the kidneys was only observed three times, but in many of the cases the proper test was not applied. In some of these cases no gray tubercles could be seen, but in most of them a few could be found scattered here and there.

There were seventeen cases in which the predominant lesion was discrete, scattered, small, yellow tubercular masses, usually associated with gray tubercles, often with larger masses of cheesy infiltration, often with thickening of the walls of the small bronchi, and occlusion of their cavities with cheesy material. In seven of the cases the lesions were confined to the

upper lobes, in ten cases they involved all the lobes. In nine cases there were one or more cavities. Tubercular lesions of other organs occurred as follows: Ulceration of the larynx, one case; tubercles in the pleura, two cases; tubercles in the capsule of the liver, one case; tubercles in the spleen, three cases; tubercles in the peritonæum, two cases; in the kidneys, three cases; ulceration of the intestines, three cases. In two cases there was hydro-pneumothorax, in one case emphysema, in one case acute pneumonia, in three cases waxy degeneration of the liver and spleen, in five cases fatty degeneration of the kidneys, in three cases waxy degeneration of the vessels of the kidneys.

It has been thought best, in view of the unsettled condition of opinions regarding the tubercular process, merely to group the cases in the above rough way.

ŒSOPHAGUS.

There was one case of ulceration of the œsophagus, occurring in a male, aged fifty-six. The ulceration extended down into the cardiac orifice of the stomach. It was not of a cancerous nature. The man had no other organic lesions, and died of *asthenia*.

STOMACH.

There were two cases of carcinoma of the stomach: the first occurring in a male, aged sixty-four, who died in January. The disease was situated along the lesser curvature of the stomach, near the pylorus. The liver was also the seat of carcinoma, the other organs being normal.

The second case occurred in a female aged sixty. The walls of the stomach were much thickened throughout their whole extent, most markedly at the cardiac orifice. The mucous membrane was thickened and of a greenish-white color. The muscular coat appeared transformed into a semi-transparent, homogeneous-looking tissue, traversed by vertical white trabeculae, placed very closely together and running from the peritonæum to the mucous coat. Toward the cardiac orifice the whole wall was of a more uniform white appearance. Near the cardiac orifice the mucous membrane was gone for a space

of one and a half inches in diameter, and a sloughy-looking mass hung into the cavity of the stomach, about one inch long and one-eighth of an inch broad. The glands around the stomach were greatly enlarged, firm, and of a white color. The peritonæum presented throughout its whole visceral layer, most especially at the mesenteric portion, numerous white patches.

Microscopically, the thickening of the mucous membrane was seen to be due partly to an increased growth of the normal epithelium, the gastric tubules being increased in length and diameter, and partly by irregular, polygonal, nucleated cells, having no resemblance to cylindrical epithelium. The whitish bands underneath the mucous membrane and peritonæum were formed of connective tissue with a few cells. The grayish tissue, which made the principal thickness of the walls, was composed of smooth muscular fibres in very great quantity, running circularly over the stomach, and of cells arranged in long follicles between the bundles of muscles. These cells were mostly polygonal, nucleated, and from $\frac{1}{1800}$ to $\frac{1}{900}$ of an inch in diameter. Many of them were fatty. There were also free nuclei and small spindle-cells. The enlarged lymphatic glands contained a number of similar cells.

DYSENTERY.

NO.	SEX.	AGE.	MONTH.	MODE OF DEATH.	COMPLICATIONS.
1.....	Male.....	49.....	September.....	Collapse.	Phthisis.
2.....	Male.....	32.....	September.....	Asthenia.....	
3.....	Female.....	32.....	September.		
4.....	Female.....	69.....	August.....	Collapse.	
5.....	Female.....	28.....	August.....	Coma.	
6.....	Female.....	49.....	August.....	Collapse.	

The above table gives at a glance the cases of dysentery.

INTESTINAL FISTULA.

There were two cases of intestinal fistula. Case I. was associated with uræmia, and is mentioned under the head of kidneys. Case II. occurred in a female, aged thirty-two, who died in August. The *post mortem* showed that a loop of the transverse colon and a loop of the jejunum were adherent to

the fistulous opening of the abdomen. The colon communicated with this opening, but the jejunum did not. There were many firm adhesions between the intestines and the abdominal walls. In both the large and the small intestines, were a number of ulcers. At some of these points of ulceration the gut was adherent to the abdominal wall. There were several small cheesy masses attached by membranous pedicles to the gut. The lesion of the intestines was accompanied by general tuberculosis.

PERITONITIS.

NO.	SEX.	AGE.	MONTH.	CAUSE.	COMPLICATIONS.
1...	Male...	17....	July....	Dysentery.	
2...	Female.	20....	Dec....	Rupture of hæmatocele into peritoneal cavity.	
3...	Male....	35....	Jan....	Tubercular ulceration.....	Phthisis.
4...	Female.	35....	Feb....	Tubercles.....	Phthisis; waxy liver; waxy spleen.
5...	Male....	50....	August.	Rupture of an abscess of the spleen.	Thickening of all of the valves of the heart.
6...	Female.	26....	August.	Rupture of vermiform appendix.	
7...	Female.	50....	Dec....	Perforation of the rectum.....	Ulceration of the colon.
8...	Female.	Still-born.	April...	Umbilical abscess.	

HERNIA.

NO.	AGE	SEX	MONTH.	VARIETY.	OPERATION.	MODE OF DEATH.	COMPLICATIONS.
1...	56..	M..	August.	Oblique inguinal entero-epiplocele.	Sac opened after repeated attempts at reduction, and portion of the omentum removed.	Collapse from peritonitis, produced by the bursting of an abscess, formed in the surrounding tissues, into the peritoneal cavity.	
2...	25..	M..	April...	Ventral entero-epiplocele.	.....	Collapse.....	Laceration of the abdominal wall. Peritonitis.

FATTY DEGENERATION OF THE LIVER.

This lesion occurred in twenty-six cases, to a marked degree. It was found in connection with lesions of other organs as follows: Pulmonary phthisis, twelve cases; chronic cardiac lesions, four cases; marked fatty degeneration of the kidney, eleven cases; other forms of Bright's disease, five cases. In one case, where there was fatty degeneration of the kidneys,

the patient died intensely jaundiced and with all the symptoms of cholemia. The livers varied in weight from $2\frac{1}{2}$ pounds to six pounds.

WAXY DEGENERATION OF THE LIVER.

This lesion occurred in thirteen cases: four in males and nine in females. All the cases were in persons between twenty and forty years of age. The livers varied in weight from $3\frac{1}{2}$ to $7\frac{1}{2}$ pounds. The waxy degeneration varied in extent in the different cases; in some only the centres of the lobules were changed, in others nearly the entire organ. The degeneration in all the cases had attacked the liver-cells, which had assumed a peculiar, smooth, translucent, homogeneous, shining appearance. The cases in which the degeneration affected the greatest part of the liver were sufficiently characterized by their gross appearances; those in which the degeneration was less extensive were readily made evident by the use of the iodine test and the microscope. In most of the cases there was also fatty degeneration of those of the liver-cells which were not waxy. In three cases the livers had been the seat of syphilitic hepatitis, their capsules were thickened, fibrous bands extended into the substance of the organ, and in these bands were small gummy tumors.

In five of the cases the patients died of pulmonary phthisis; in four of the cases there was a distinct syphilitic history; in one case there was chronic disease of the knee-joint; in one case there was chronic cardiac disease; and in one case, a small aneurism of the superior mesenteric artery. Waxy degeneration of other organs, accompanying that of the liver, was observed as follows: of the spleen, eleven cases; of the kidneys, ten cases (affecting the Malpighian tufts and small vessels); of the vessels of the walls of the heart, one case.

In one of the cases in which the liver was much degenerated and weighed $6\frac{1}{2}$ pounds, but was accompanied by no cardiac or kidney disease, there was marked ascites, the abdominal cavity being nearly full of fluid, and this condition had existed for several months before death.

CIRRHOSIS OF THE LIVER.

This lesion occurred in twelve cases: nine in males and three in females. Eleven cases were in persons between thirty-five and sixty years old, and one was in a person twenty-eight years old. The livers varied in weight from 1 lb. 14 oz. to 7 lbs. 6 oz. In the larger livers there was also marked fatty degeneration of the liver-cells. Ascites existed only in two cases. The spleen varied in size from 5 oz. up to 2 lb. 3 oz. In general, its size was in inverse ratio to that of the liver. In eight cases there was kidney disease, either granular, fibrous, or fatty.

One case was of distinctly syphilitic origin. It occurred in a woman twenty-eight years old, who had contracted a chancre six years before, and since that time had suffered from various secondary lesions. The liver weighed 2 lb. 5 oz.; the capsule was thickened, fibrous bands passed from the capsule into the substance of the organ so as to give it a lobulated appearance, and there was an increased amount of fibrous tissue between the lobules.

GUMMY TUMORS OF THE LIVER.

This lesion occurred in eleven cases: five in males and six in females. All were in persons between twenty and forty-five years old. In three cases there was a syphilitic history; in two cases the previous life of the patients was such as to render syphilis almost a necessity; and in the other five cases there was no syphilitic history, but the patients were not questioned concerning this point during their stay in the hospital.

In eight of the cases the capsule of the liver was thickened, and there were fibrous bands extending from the capsule into the substance of the organ; in these fibrous bands were situated the gummy tumors. In the other three cases the tumors were scattered through the substance of the organ. The tumors were small, not larger than a pea, white or yellowish white, opaque, of firm consistence, and either hard and fibrous, or broken down, softened and fluid, most of them cheesy in the centre. Those which were neither fibrous nor softened consisted of little, round, pale cells, exactly resembling those found in the fresh granulations of wounds. Those

which were hard and fibrous consisted of connective-tissue fibres and fusiform cells; and those which were cheesy and soft consisted of granular matter. In one case the tumors reached a large size. This was in a man, thirty-four years old, in whom the liver weighed 6 lb. 10 oz., was lobulated, and at the middle of the posterior edge was a large white mass, the size of a child's fist, made up of a number of smaller tumors. On the convex surface of the right lobe near its anterior border was another similar mass, the size of a hen's egg. There were other smaller tumors scattered through the organ.

In four of the cases the liver had undergone waxy degeneration; in two cases there were gummy tumors in the spleen; and in two cases, waxy degeneration of the spleen. In five cases there was waxy degeneration of the vessels of the kidneys; and in one case there was waxy degeneration of the vessels of the walls of the heart.

TUBERCULOSIS OF THE LIVER.

This lesion occurred in seven cases; two in infants, four between the ages of five and twenty-three, and one at the age of forty-five. In all the cases there was acute general tuberculosis, attacking the lungs and other organs. The tubercles were in the form of small gray granulations, in a few cases yellow, situated immediately under the capsule of the liver.

THE PIGMENT (OR BRONZED) LIVER.

This lesion was observed in five cases; all males, between the ages of nineteen and fifty. In three of the cases, the patients had resided for some time in malarious districts in the South. In all the cases the patients died with the symptoms of an acute attack of remittent fever. The livers varied in weight from 3 lbs. 3 oz. to 4 lbs., were of a dark-olive or reddish-brown color, and not at all congested. In all the cases the spleen was enlarged, weighing from 12 oz. to 2 lbs., and was of the same dark color as the liver. In two cases the kidneys were also somewhat pigmented.

In all the cases, the liver, spleen, and kidneys, in four of the cases, the blood from the portal and hepatic veins, and in one case, the blood from the lungs and inferior vena cava, were

subjected to microscopical examination. The results obtained in all the cases were the same, and agree essentially with those stated by Frerichs. There were found in the blood a number of pigmented bodies of various shape, some long and fusiform, others round or oval, and others of irregular caudate shape. These bodies were formed of a transparent, finely-granular substance, without any thing like a cell-wall, and with badly-defined edges. The round and oval bodies measured from $\frac{1}{2500}$ to $\frac{1}{700}$ of an inch in diameter; and in a small number of them a well-defined small nucleus was seen. In all these bodies black pigment was found in the shape of small, black, angular particles, but in variable amount. Some of the round bodies contained no pigment, while others were nearly filled with it. There were also seen solid masses of black pigment of irregular shape. All these bodies were found in the greatest numbers in the blood of the hepatic and portal veins; and in the blood from the lungs and inferior vena cava they were less numerous.

The livers presented no changes except in their color. They were not congested; there was no increase of the fibrous tissue; the gall-bladders contained normal bile; and the liver-cells were unchanged. When thin sections were made so as to show the lobules, it was evident that the pigment was scattered throughout the substance of each lobule. No pigment was seen in the inter-lobular or intra-lobular veins, nor was it more abundant near them, but was scattered uniformly through each of the lobules. When looked at in this way, it might easily be thought that the pigment was situated in the liver-cells. In order to determine more exactly the seat of the pigment, one of the livers was injected with Prussian blue. When thin sections were made, it was evident that the pigmented bodies were situated in the capillary venous plexus of each lobule. The hepatic artery was not injected, so that it was not ascertained whether its branches also contained pigment. When portions of the liver were torn with needles, numbers of pigmented bodies, like those in the blood, and especially the round forms, were found, and in a few of the specimens several liver-cells were seen containing a few black granules. In the spleens great numbers of these pigmented bodies were found, but their exact situation was not ascertained. In the kidneys

there were very plainly pigmented bodies in the capillaries of the Malpighian tufts. In none of the cases was there an increased number of white blood-globules in the specimens of blood examined.

CARCINOMA OF THE LIVER.

This lesion occurred in five cases; two in males, three in females, at the respective ages of fifty-one, thirty-one, sixty-four, fifty-five, and sixty years. In three cases, it was secondary to carcinoma of the stomach; in one case to carcinoma of the superior maxilla; and in one case it was primary. In two cases, the lungs, and in one case, the spleen also contained nodules of cancer. In all the cases but one, the cancerous nodules were small, scattered through the liver, and this organ not enlarged.

One case, occurring in a female fifty-five years old, presented some peculiarities. The liver weighed 6 lbs. 8 oz., and contained a number of tumors, from the size of a hen's egg to that of an orange. Some of the tumors were solid, with softened centres, and others contained large cavities filled with yellow serum. The tumors were composed of nucleated cells contained in regular fibrous alveoli. There was no carcinoma of any other organ, but the gall-bladder was small, bound to the liver, filled with gall-stones, and its walls thickened with carcinomatous tissue.

THROMBOSIS OF THE PORTAL VEIN.

The morbid specimens obtained in this case, together with the history, were presented at a meeting of the Pathological Society, of this city.

The following is the history of the case: Thomas Burns, forty-seven years of age, was admitted to the Bellevue Hospital on the 11th of February, 1867. He died on the 22d of the same month. His illness began three weeks before his admission to the hospital. His first symptoms were pain in the right side, and cough. These continued. He had, when admitted, a feeble and frequent pulse, and his respiration was hurried.

The percussion-sound was dull over the posterior part of

the right side of the chest, as high as the angle of the scapula. The respiratory murmur and vocal resonance were absent over the same part. Eight days later, the symptoms became markedly typhoid. The abdomen was tender, painful, and tympanitic. The urine contained granular casts, but was free from albumen.

At the autopsy, the brain and its membranes were normal.

The left pleural surfaces adhered to one another. The right pleural sac contained a small amount of serum. Hypostatic congestion was observed in both lungs.

The heart weighed ten ounces, and was normal. The abdomen was very tympanitic. The peritoneal sac contained a large amount of serum and lymph. The different viscera were adherent to each other and to the abdominal wall.

The spleen weighed nine ounces, and was normal. The kidneys weighed twelve ounces.

The stomach and intestines were distended with gas, and, with the exception of a small polypus situated in the descending colon, their mucous membrane was normal. The bladder and the prostate gland were normal.

The liver weighed $6\frac{1}{2}$ pounds. It was much enlarged, and during its removal pus escaped from a superficial abscess. It was impossible to decide whether the abscess had been ruptured by the manipulation necessary for the removal of the liver, or had opened previous to death. The right lobe contained a large number of abscesses, many of them superficial. Only one attained the size of a black walnut. The rest of them were of the size of a pea or of a large cherry. They contained a thick, white, purulent fluid, which was in some stained by bile. Their walls consisted of the liver-tissue in a shreddy state. Only two abscesses existed in the left lobe.

On section of the liver, a purulent-looking fluid escaped from the portal veins of each lobe. In the left lobe, several of the small portal veins were observed, which were obstructed by small, reddish thrombi. The right lobe was too much disintegrated to show this appearance. A fish-bone, two inches in length, was found, so situated that one-half was in the portal, the other half in the superior mesenteric

vein. The middle portion of the bone was covered by a thin, whitish clot, which caused it to adhere to the inner coat of the veins. The ends of the bone were free and bare. The clot and bone measured only $\frac{1}{12}$ of an inch in thickness. There were no signs of inflammation of the veins at this point.

The external coat of the portal vein at the point of its division into its right and left branches was thickened. The left branch was filled by a firm, reddish-white thrombus, over an inch in length. The right branch was lined by a layer of decolorized fibrin. The internal coat of each branch appeared normal.

The lymphatic glands in the fissure of the liver were enlarged.

HYPERTROPHY OF THE SPLEEN.

This lesion occurred in four cases, all males between the ages of twenty and fifty-one. The spleens varied in weight from 1 lb. 7 oz. to 2 lb. 3 oz. Their capsules were much thickened, and there were false membranes on their external surfaces. In the splenic substance no change could be seen, but that of bulk. In one case, the liver was fatty; in one case, cirrhotic; and, in one case, it contained syphilitic gummy tumors.

WAXY DEGENERATION OF THE SPLEEN.

This lesion occurred in thirteen cases, five in males, eight in females, between the ages of sixteen and forty years. In ten of the cases the degeneration affected nearly the whole organ, giving a uniform smooth, waxy appearance. In the other three cases the degeneration had only affected the Malpighian bodies, which looked like gray, transparent grains scattered through the organ forming the so-called Lago spleen. The spleens varied in weight from 5 oz. to 1 lb. 1 oz. In two of the cases there was a syphilitic history; in five cases the patients had suffered from pulmonary phthisis; and in one case, from chronic joint-disease.

In eleven of the cases there was also waxy degeneration of the liver; in three cases, gummy tumors of the liver; in seven cases, waxy degeneration of the blood-vessels of the kidney; and in six cases, fatty degeneration of the kidneys.

GUMMY TUMORS OF THE SPLEEN.

This lesion occurred in two cases, both males, respectively forty and forty-four years of age. In one case the spleen weighed 6 oz., and in the other, 1 lb. 6 oz. In both cases the gummy tumors were small, opaque, and white, some of them softened, and situated in the splenic tissue. In neither case was there waxy degeneration of the spleen. In both cases there were also gummy tumors in the liver.

TUBERCLES IN THE SPLEEN.

This lesion occurred in eight cases, four males and four females; three cases in children under one year old; one case at five years; one at twenty-three; one at thirty-two; and two at forty-five. In all the cases but one, the tubercles were in the form of gray, semitransparent granulations, mostly situated immediately under the capsule of the spleen. In one case there were two yellow, cheesy tumors the size of a pea. In all the cases the patients died with general tuberculosis.

CARCINOMA OF THE SPLEEN.

This lesion occurred in one case, a female, thirty-one years of age. The tumors in the spleen were secondary to primary carcinoma of the superior maxilla, and were associated with other secondary tumors in the liver and lungs. The spleen was not much enlarged, and the cancerous nodules were small.

CYSTS IN THE SPLEEN.

This lesion occurred in two cases, both in males, forty-five and fifty-six years old respectively. In one case the spleen weighed 3 oz., and there was a cyst the size of a chestnut near its lower edge, containing clear serum. In the other case the spleen weighed 8 oz. The cyst was rather larger than a chestnut, and contained serum and cholesterine.

INFARCTI OF THE SPLEEN.

This lesion occurred in five cases, three males and two females, all between the ages of twenty-two and fifty years. The

spleens weighed respectively 7 oz., 7 oz., 9 oz., 15 oz., 5 lbs. There were found in the spleens, circumscribed portions of opaque, white tissue, usually surrounded by splenic tissue of a deep-red color, sometimes partially separated from the surrounding tissue, and sometimes having more the shape and consistence of cicatrices, varying in size from a pea to a hen's egg. When examined with a microscope, these bodies were found to consist of exactly the same elements as the surrounding spleen-tissue, except that in some there was more granular matter, and in some more fibrous tissue. In one case, one of these white masses was surrounded by a thin layer of gangrenous tissue, the capsule of the spleen was perforated, and some of the dead tissue had escaped into the peritoneal cavity, causing peritonitis and death.

In three of the cases there were vegetations on the aortic valves; in one case on the mitral valves; and in one case on both the aortic and mitral valves. These vegetations were large and rough in all the cases. In one case there was caries of the ilium and a large abscess. In one case there was an apoplectic effusion at the base of the brain. In one case there was atheroma of the splenic artery and of some of its branches.

FATTY KIDNEY.

NO.	AGE.	SEX.	MONTH.	WEIGHT.	MODE OF DEATH.	COMPLICATIONS.	URINE.
1.	50.	Male.	May.	13 ounces.		Peritonitis; aortic and mitral disease; calcareous plates on inner coats of splenic and portal veins.	
2.	48.	Male.	May.	12 ounces.		Pleuro-pneumonia.	
3.	23.	Male.	May.	17 ounces.	Asthenia.	Iliac abscess; subacute meningitis.	Not examined.
4.	50.	Female.	May.	12 ounces.	Asthenia.	Double pneumonia; spots of gangrene on both legs.	Not examined.
5.	40.	Female.	June.	14 ounces.		Phthisis.	
6.	30.	Female.	June.	14 ounces.	Convulsions.	Pregnancy.	Albumen and casts.
7.	35.	Female.	July.	14 ounces.	Coma.	Fatty liver; phthisis.	Albumen and casts.
8.	17.	Female.	June.	15 ounces.	Exhaustion.	Mitral disease.	Albumen; fatty casts.
9.	36.	Male.	June.	7 ounces.	Convulsions.		No albumen; granular casts.
10.	40.	Female.	November.	12 ounces.	Coma.	Fatty liver.	Not examined.
11.	60.	Female.	November.	13½ ounces.	Coma.	Fatty liver.	No albumen; granular casts.
12.	29.	Male.	January.	15½ ounces.	Asthenia.	Pleuro-pneumonia; phlegmonous erysipelas.	Albumen; fatty and granular casts.
13.	14.	Female.	February.	11 ounces.	Coma.	General anasarca; effusion into abdominal cavity; erysipelas.	Albumen; pus; fatty casts.
14.	38.	Female.	March.	13 ounces.	Asthenia.	Edema of lungs; effusion into peritoneal cavity; disease of aortic and mitral valves.	
15.	55.	Female.	August.	11 ounces.	Coma.	Phthisis.	Suppressed.
16.	40.	Female.	April.	14 ounces.	Coma.	General edema.	Albumen; granular, fatty, and hyaline casts.
17.	27.	Male.	May.	12½ ounces.	Coma.	Edema of legs; aortic disease; pleuro-pneumonia; pyonephrosis.	Albumen; hyaline and granular casts.
18.	21.	Female.	December.	8 ounces.	Asthenia.	Pyæmia.	Ilyaline casts.
19.	45.	Male.	January.	11 ounces.	Asthenia.	Cirrhosis; general edema.	
20.	34.	Male.	February.	15 ounces.	Asthenia.	Aortic and mitral disease; general edema.	Albumen; casts.
21.	40.	Female.	March.	9 ounces.	Coroner's case.	Endocarditis; fatty liver.	
22.	48.	Male.	May.	10 ounces.	Not stated.	Phthisis.	Fatty and hyaline casts.
23.	45.	Female.	May.	6 ounces.	Coma.	Carcinoma uteri.	Albumen.
24.	36.	Female.	August.	14 ounces.	Not stated.	Fatty liver.	
25.	23.	Male.	August.	16 ounces.	Not stated.	Phthisis; cardiac disease; infarction of spleen.	

FIBROUS KIDNEY.

NO.	AGE.	SEX.	MONTH.	WEIGHT.	MODE OF DEATH.	COMPLICATIONS.	URINE.
1.	45.	Male.	February.	8½ ounces.	Unknown.	Hydrothorax; œdema of lung; pneumonia; endo- and pericarditis.	
2.	50.	Female.	April.	6 ounces.	Convulsions.	Small cysts in kidneys; disease of the mitral valves.	
3.	49.	Male.	May.	8 ounces.	Asthenia.	Small cysts in kidney; general œdema; erysipelas.	
4.	38.	Female.	June.	10½ ounces.	Convulsions.	Waxy liver; œdema of lung; mitral disease.	
5.	56.	Male.	July.	6½ ounces.	Convulsions.	Small cysts in kidney; general œdema, and effusion into all the cavities; remains of an apoplectic clot.	Albumen; granular casts.
6.	40.	Female.	October.	6½ ounces.	Coma.	Mitral disease.	Normal.
7.	15.	Male.	June.	10 ounces.	Convulsions.	Cysts in kidney.	
8.	38.	Female.	August.	14 ounces.	Coma.	Cancer of uterus; dysentery.	Not examined.
9.	62.	Male.	May.	6 ounces.	Asthenia.	Phthisis; pneumonia.	
10.	39.	Female.	July.	4 ounces.	Coma.	General œdema; mitral and aortic disease.	Albumen; granular casts.
11.	27.	Female.	September.	16 ounces.	Convulsions.	Tubo-rectal fistula.	No albumen; no casts.
12.	66.	Male.	December.	6½ ounces.	Asthenia.	Phthisis; erysipelas; general œdema.	
13.	35.	Male.	February.	5 ounces.	Asthenia.	Pleuro-pneumonia.	Albumen; casts.
14.	62.	Male.	July.	6½ ounces.	Coma.	Edema of the lungs; fatty liver.	

WAXY KIDNEY.

NO.	AGE.	SEX.	MONTH.	WEIGHT.	MODE OF DEATH.	COMPLICATIONS.	URINE.
1.	22.	Female.	April.	12 ounces.		Waxy liver; waxy spleen; apoplexy; aortic and mitral disease.	No albumen; no casts.
2.	35.	Female.	June.	20 ounces.	Asthenia.	Aortic disease; waxy liver; waxy spleen; diarrhœa; facial erysipelas.	
3.	33.	Female.	October.	12 ounces.	Asthenia.	Waxy liver; waxy spleen; disease of all the valves of the heart; general œdema.	Albumen; granular and fatty casts.
4.	22.	Male.	March.	8 ounces.	Convulsions.	General œdema; effusion in all the serous cavities.	
5.	44.	Male.	February.	11 ounces.	Convulsions.	Waxy liver; waxy spleen; slight œdema of the lower extremities.	
6.	22.	Male.	February.	8 ounces.	Convulsions.	Waxy liver; waxy spleen; general œdema.	Albumen; hyaline, granular, and blood casts.
7.	38.	Female.	June.	10½ ounces.		Mitral disease; waxy liver.	
8.	35.	Female.	January.	14 ounces.	Coma.	Waxy liver; waxy spleen.	Suppression of the urine.
9.	37.	Female.	September.	8 ounces.	Asthenia.	Waxy liver; waxy spleen; phthisis.	Not examined.

ABSCESS OF THE KIDNEY.

There were three cases of abscess of the kidney: two in males, and one in a female. The age of each of the males was forty years. The age of the female was twenty-one years. The two cases in which the disease was found in males occurred in October, the other in August.

The weight of the kidneys was respectively twenty, fifteen, and ten ounces. Asthenia caused death in two of the cases, and the cause was not stated in the remaining case.

The complications were pyæmia, pregnancy, and peritonitis. Albumen and hyaline casts were found in the urine in one case.

CARCINOMA OF THE KIDNEY.

There was one case of carcinoma of the kidney, in a male, thirty-five years of age. The disease of the kidney was complicated by cardiac disease and œdema of the lungs. The carcinoma was situated in the right kidney.

Twelve examinations were made, where death occurred at a short period after labor, and the pelvic viscera or the peritonæum exhibited inflammatory lesions.

The following is a list of the parts involved:

One case of simple peritonitis.

Seven cases of metro-peritonitis.

Two cases of endo-metritis.

One case of endo-metritis and pelvic cellulitis.

One case of abscess of the uterus.

PERITONITIS.

The woman in this, the only case of death from peritonitis without endo-metritis or parenchymatous metritis, was twenty-three years of age. The total duration of labor had been forty-two and a half hours. The duration of the second stage had been thirteen hours. The history stated that the woman had had symptoms of peritonitis the day after labor; that these symptoms had disappeared on the following day, and had only returned twelve hours before her death. She died on the seventh

day after labor, in July, 1866. The peritoneal sac contained fresh lymph and a purulent fluid. The kidneys were granular.

METRO-PERITONITIS.

The autopsies of the seven patients dying of metro-peritonitis were made in July and December, 1866, and in January, March, April, May, and September, 1867.

The ages of the patients were between twenty and twenty-eight years, with one exception; viz., thirty-five years. The disease had developed itself in five cases between the twelfth hour and the sixth day after the labor had been completed. Death occurred between the thirty-sixth hour and the fourth day after the symptoms had manifested themselves, and between the third and the ninth day after the termination of labor.

The following is a brief detail of some particulars of the different cases:

CASE I.—The second stage of labor had lasted thirty-six hours. The disease commenced on the second, and death occurred on the fifth day after labor. Pneumonia and fatty kidneys were complications.

CASE II.—The disease commenced on the sixth, and death occurred on the ninth day after labor. Fatty liver and kidneys and double pleuro-pneumonia were complications.

CASE III.—The second stage in this case was eight and three quarters hours in duration. Mania had occurred, which had masked the symptoms of peritonitis. The complications were fatty liver, congestion of both kidneys, small abscesses in the right kidney, and purulent infiltration of the broad ligaments.

CASE IV.—The labor was natural. The disease commenced on the third day after labor, and death occurred in thirty-six hours. The complications were cystitis, pyelitis, and congestion of the kidneys.

CASE V.—The second stage of labor lasted eighteen hours. Forceps were used for the delivery of the child. Metro-peritonitis developed on the twelfth hour after delivery, and death occurred three days later. The following were the diameters of the inlet of the pelvis: antero-posterior, three and a half

inches; transverse, four and a half inches; oblique, four and three quarters inches. The complications were a fistulous opening between the neck of the uterus and the bladder, situated one inch above the external os and measuring one and one eighth inches in diameter, and intense cystitis.

CASE VI.—The death occurred on the fourth day after labor. Pneumonia and thickening of the heart-valves were complications.

CASE VII.—The placenta was delivered by the hand on account of adhesions. The disease commenced on the sixth day after labor, and death occurred in thirty-six hours. The other organs were normal.

ENDO-METRITIS.

CASE I.—A woman, aged twenty-eight years, died eight and a half days after labor, of post-partum convulsions, which had commenced twelve hours before death. There were endometritis and parenchymatous metritis. With the exception of the kidneys, which were too far decomposed for examination, the other organs of the body were normal. The examination was made in July, 1867.

CASE II.—The patient was nineteen years of age, single, and primipara. She had mania of eight days' duration, commencing two days after labor. On examination, July, 1866, there was found endo-metritis. The kidneys were fatty, and the other organs normal.

PELVIC CELLULITIS AND METRITIS.

In this case the woman was eighteen years of age, and developed puerperal mania seven days after labor. In her case there was metritis associated with inflammation of the broad ligaments and of the cellular tissue of the pelvis in proximity to the veins. The other organs were normal. The kidneys were too much decomposed for examination. The autopsy was made in July, 1867.

ABSCESS OF THE UTERUS.

The patient was twenty-one years of age, and showed symptoms of pyæmia six weeks after labor. She died at the expiration of two weeks after these symptoms had developed. The uterus was of normal size, and in its walls was a small

abscess. The kidneys were fatty. There was no lesion of any other organ.

NON-PUERPERAL PERITONITIS.

Peritonitis due to inflammation of the genito-urinary organs of the female occurred in three cases, independently of parturition.

CASE I.—The patient was twenty-three years of age. The autopsy was made in September, 1866. The bladder was the seat of a severe inflammation; its mucous membrane was intensely congested, thickened, and the seat of ulcerations; and its walls were also thickened in some parts. There was recent exudation of lymph upon the peritoneal surface of the bladder and of the neighboring intestines, gluing them together. In addition there was suppuration in the cellular tissue around the right kidney. The pelvis of each kidney was inflamed. The kidney-structure seemed normal, as did also the ureters. The uterus was normal.

CASE II.—The patient was twenty years of age. She had had symptoms of peri-uterine hæmatocele two months previous to her death, and she had apparently recovered from this, when the symptoms of peritonitis were developed.

A large abscess was found between the posterior wall of the vagina and uterus and the rectum. There was a small opening leading from this into the peritoneal sac. The abscess contained merely a purulent fluid, and no clots. The abdominal cavity also contained purulent fluid.

CASE III.—The patient was thirty years of age. In this case the os externum was almost occluded. There was dilatation of the cavity of the body and of the neck of the uterus, with inflammation of the mucous membrane. The Fallopian tubes were dilated, convoluted on themselves, and adherent to the ovary and to the uterus. In the left there was a dirty sero-purulent fluid; while the right was thickened, lined by a layer of false membrane, and empty. The latter circumstance was due to its having been cut in its removal. There was no point of rupture to be made out. The tubes communicated with the uterus. There was a considerable exudation of lymph on the peritonæum, especially in the pelvis.

UTERO-TUBO-RECTAL FISTULA.

This condition was found in the body of a female, twenty-seven years of age, who died of convulsions. The kidneys were fatty and the lungs tuberculous.

The os uteri externum was occluded. Both Fallopian tubes were dilated, containing a muco-purulent fluid, as did also the uterus. There was no communication between the right tube and the uterus, but the latter communicated with the rectum, by means of a small fistulous opening situated in the upper posterior part of the right side of the fundus. The uterine orifice of the left tube was pervious, while on the other side it communicated with a small cavity in the ovary, and this latter was connected by a narrow fistulous opening with the rectum. Each ovary contained in its substance a clot of dark-red blood, about half an inch in diameter.

PELVIC ABSCESS COMMUNICATING WITH THE UPPER PART OF THE
VAGINA.

The autopsy was made in January, 1867. The patient was fifty years of age. During life she had a profuse purulent discharge from the vagina, and developed symptoms of pyæmia. She died of asthenia.

There was on the right side of the pelvis a large abscess, situated both beneath the obturator internus muscle and between it and the fascia. It extended into the thigh through the obturator foramen, and beneath the obturator externus muscle, as far as its points of attachment to the femur. It also accompanied the femoral vessels as far as the cribriform fascia. A small piece of pubic bone, forming the margin of the obturator foramen, was eroded. There was a narrow fistulous communication between the abscess and the upper part of the vagina, on the right side near the cervix uteri. The uterine cavity was enlarged and was lined by a layer of false membrane.

The external and internal iliac veins of this side were surrounded by indurated tissue. The interior of the external vein was normal. The internal iliac was lined by a layer of whitish, buff-colored fibrin, and in the centre of this was a small quantity of a thick, whitish fluid. The common iliac vein contained a loose fibrinous clot, one fourth of an inch long.

There were small abscesses in both lungs. The other organs were normal.

FRACTURES.

There was one case of fracture of the skull by a pistol-ball, in a male, aged forty-eight. The fracture was situated at the postero-inferior angle of the parietal bone. He had been trephined, and the dura mater opened; and at this point a fungous growth developed from the brain. At this point, also, the brain-tissue was much disorganized. There was another pistol-ball received on the parietal boss of the same bone, leaving no external trace of any note, but internally there was a slight effusion of blood separating the dura mater from the skull. There was also a laceration of the brain, exactly corresponding to the external injury. This was a case of suicide; and the man, after shooting himself twice, jumped out of a fifth-story window, breaking both bones of both legs. When he had fallen to the ground he drank about a gill of sulphuric acid. He died on the third day after the receipt of his injuries, from the brain-trouble.

FRACTURE OF THE NECK OF EACH FEMUR.

The patient, a male, sixty years of age, was treated in the hospital, in 1863, for fracture of the right cervix femoris, and in December, 1866, was admitted with fracture of the left cervix femoris. Three days later he died suddenly of a cerebral clot. The following is a description of the specimens: There was a fracture of the left cervix femoris, intra-capsular, with the exception of a small portion anteriorly, where the fracture became extra-capsular. The sides and posterior surface of the head of the bone within the capsule and the fractured surfaces without the capsule had become rounded and smooth, so as to form a false joint admitting of considerable motion. There was a recent fracture of the right cervix femoris, partly intra-capsular and partly extra-capsular.

CARCINOMA OF THE SUPERIOR MAXILLA.

There was one case of carcinoma of the superior maxilla, in a female, aged thirty-one years. The bone was removed, and at the same time the carotid artery of that side was ligatured. This ligature was followed by marked cerebral symp-

toms and hemiplegia. The patient died about seventy days after the operation, from abscess of the brain. The heart, liver, and kidneys presented carcinomatous growths.

MORBUS COXARIUS.

There was one case of morbus coxarius, in a female, aged twenty-one years, who died of general tuberculosis. Several small abscesses were found around the joint, but not communicating with it. The capsule was thickened, and the cartilage covering the head of the bone was displaced by a thick layer of firm, cheesy substance, under which the bone was denuded. The cartilage was still present, but displaced and thinned. On the acetabulum were several spots of denuded bone. The whole cavity of the joint was filled with the same cheesy matter.

POTT'S DISEASE OF THE SPINE.

There was one case of Pott's disease, situated in the dorsal vertebræ, in a female, thirty-one years of age. The disease of the spine was accompanied by a psoas abscess pointing in Scarpa's triangle. The cause of death was asthenia, accompanied with diarrhœa.

ASIATIC CHOLERA.

The number of *post-mortem* examinations made on patients who had died of cholera was twenty-two. These all occurred during the summer and the early part of the fall of 1866. They were distributed over the different months in the following order: one in June, five in July, thirteen in August, two in September, and one in October. Of the patients, three were males and nineteen, females. Fifteen (two males and thirteen females) died in collapse. The remaining seven died during the period of reaction. The following table will show the age at which death occurred in these patients:

	No. in Collapse.	Reaction.	Total.
Between 10 and 20 years,.....	1	1	2
“ 20 and 30 “	3	4	7
“ 30 and 40 “	4	1	5
“ 40 and 50 “	3	1	4
“ 50 and 60 “	3	—	3
“ 60 and 70 “	1	—	1

The eldest was a woman sixty-nine years of age, and the youngest, a boy of ten years.

Of those dying in collapse, the death occurred in one case on the first, in five cases on the second, in three cases on the third, in two cases on the fourth and on the fifth, and in one case on the seventh and on the tenth day of the disease (these periods including the preliminary stage). During reaction the deaths occurred, one case each on the second, third, sixth, seventh, and eighth, and two cases on the ninth day. Five, during the period of reaction, died comatose, while the mode of death in the other two cases dying during this period is not mentioned.

LESIONS FOUND IN THOSE DYING IN COLLAPSE.

Brain and Membranes.—In six cases these parts presented nothing abnormal. In three cases there was a considerable amount of serous effusion, both sub-arachnoid and ventricular, which in one instance was bloody, and in another was associated with an old apoplectic cyst in the brain. In one case there was a slight abnormal congestion of the vessels of the pia mater, and a small amount of subarachnoid effusion. Neither the age, the duration of the illness, nor the length of time lapsing between the time of death and that of the autopsy, seems to have had any connection with these differences.

Heart.—There was either fluid blood or clots in the right cavities and none in the left, in seven of the cases, while in one instance there were clots in the left cavities and none in the right. In three cases there was a slight valvular thickening on the left side; and in one, an adherent pericardium of long standing.

Lungs.—These organs were anæmic in eight cases. The weight of both lungs in one instance being reduced to nineteen ounces, and in another to twenty-six and a half ounces. In no case was there marked congestion, without some disease of the lung. Pneumonia, small in amount, occurred once. Tubercles were found in four cases, the lungs in one case having cavities, and in one case there was merely a small, cheesy deposit. Slight emphysema of the lungs was found twice.

Liver.—Only once was the liver markedly congested.

Twice it was cirrhotic, once fatty, and once the seat of gum-mata. Its average weight in thirteen cases was three pounds.

Spleen.—This organ was twice found enlarged, but in each of these cases there had been intermittent fever.

Kidneys.—These organs were fibrous in three cases, in two cases small cysts also existed. In three cases they were fatty, and once there was pyelitis. In the other cases they are recorded as being normal. The average weight of both kidneys, in ten cases, was seven and four-tenths ounces.

Intestines.—In all except one of the cases there was congestion in some part of the alimentary canal, while in six cases it extended throughout. In eight of the cases the stomach was not markedly congested. Only in three cases was congestion absent from the small intestine. In four cases the solitary glands of this part and Peyer's patches were enlarged. Ecchymoses are also mentioned as occurring in three cases. The so-called diphtheritic exudation occurred only once. It was colored green, and was found in the lower part of the ilium. The colon was more or less congested, with but two exceptions. Ecchymoses occurred in this portion of the canal in eight cases. Exudation was only once found, and in a different case from the one noticed above. In four cases the mucous membrane was ulcerated, which was due in one instance to a dysentery becoming complicated by cholera. The contents of the intestine varied in its different portions somewhat. In five cases the fluid in the small intestine was stained by bile, in six cases it was a thin liquid resembling gruel, and in one case it was colored deep brown. In three cases the fluid in the large intestine was stained with blood, and in each of these cases there were ulcers in this part of the intestine.

Bladder.—This viscus contained a small amount of urine in two instances.

The diseases with which cholera-collapse was associated were as follows: chronic rheumatism, one; pneumonia, one; pelvic cellulitis, one; Bright's disease, as marked by symptoms during life, one; dysentery, one; and visceral syphilis, one.

LESIONS FOUND IN THOSE DYING DURING REACTION.

In four of the seven cases the brain was examined. Twice it was found congested. Once it was normal. In the remaining case there was a considerable quantity of serum under the arachnoid. The heart was normal in all the cases.

Lungs.—They were normal in three instances. In three cases they were the seat of tubercle, which was in one merely a small, cheesy deposit. In one case there was marked hypostatic congestion of the lungs.

Liver.—In two cases this organ was fatty, while in the others it was normal. Its average weight in five cases was three pounds.

Intestines.—The intestines were found congested in all the cases. In three the solitary glands and Peyer's patches were enlarged. The diphtheritic exudation occurred once in the lower part of the ileum. Ecchymosis existed in the colon in one case. Ulcers were found in the intestines twice, in one case, tubercular, in the other they were situated in the duodenum and colon. The kidneys were in two cases congested, and in two, fatty. Their average weight (for both) was nine and four-fifths ounces.

Spleen.—This gland was normal in all the cases.

Bladder.—The bladder is mentioned as having been empty in three cases.

Besides the associated diseases noticed above, cholera occurred once in a patient suffering from rheumatism.

XIII.—EFFECTS OF EXCESSIVE INTELLECTUAL EXERTION.

On some of the Effects of Excessive Intellectual Exertion. By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine in the Bellevue Hospital Medical College, etc.

THE condition in which the brain is left after very intense or protracted mental application, or as a consequence of powerful emotional disturbance, is one of very great importance, both as regards the immediate results to the individual and as predisposing to subsequent disease. Nevertheless, the subject is almost unstudied except in its incidental relations. In fact, the difficulties which surround it are, so far as we can perceive, insurmountable, with our present opportunities and appliances for research.

That an increased amount of blood flows through the cerebral vessels during mental activity, that these vessels may become permanently over-distended, and that profound interstitial changes are produced in the brain-substance, are facts very generally admitted. The first two are capable of actual demonstration, the last is a matter of inference, but of inference so very decided in its character as scarcely to allow of the existence of a doubt. What these changes are, and what exact relations they bear to the kind and degree of cerebral action, we are far from being able to determine.

Helmholtz,¹ several years ago, ascertained for muscles,

¹ Müller's Archiv. 1843, p. 72. Also, Die Chemie der Gewebe, von Julius Eugen Schlossberger. Erster Band, Leipzig & Heidelberg, 1856, p. 186.

what we cannot, with any degree of fulness, determine for the brain. He amputated the legs of a frog, and, leaving one of them in a state of rest, excited the other to contractions by means of galvanism, and continued the action so long as the muscles retained their irritability. The flesh of the two limbs was then submitted to chemical examination, with the result that the water-extractive was found to be from twenty to twenty-four per cent. less in the exercised limb than in the other, while the alcoholic extract was correspondingly increased. I have recently repeated Helmholtz's experiment, and have obtained similar results.

Gulliver's¹ observations lead to no important conclusion, except that muscular rigidity ensued at a comparatively recent period in animals hunted to death.

The effect of emotion over the solids and fluids of the body has long been known. Scarcely an organ resists this influence altogether, and some exhibit it in a very marked degree. Even the muscles are subject to it, and may be profoundly changed in chemical constitution, through emotional disturbance or physical suffering. Doubtless the primary effect is, in such cases, produced upon the blood, but this does not lessen the value of the example as analogical to what we have ample assurance takes place in the structure of the brain from similar causes.

The influence of bodily suffering, in rendering the flesh of animals poisonous, is very strikingly shown in the following account :

"In order to procure a roast for Easter," says Dr. Röser, "C. in R. desired his family to set a snare for a roebuck. Accordingly one of these poor animals was caught in the snare, which, as its head and breast had passed through, held it by the hinder parts of the body, the abdomen and pelvis being enclosed in the cord, so that it must have succumbed after a most agonizing struggle. It was found dead the next day.

"The master and mistress of the family ate, on Easter-day, the best part of this dainty; the servants had little; the remainder was laid in vinegar, but not eaten.

¹ Edinburgh Medical and Surgical Journal, October, 1848.

“On the same day, all of the family who had eaten of the venison observed a striking dryness of the mouth, oppression at the stomach, and nausea; all complained of oppression of the head, giddiness, and great weariness of the limbs. The master lost his sight for several days, and, in short, there now began a series of remarkable symptoms, requiring in many ways the assistance of Dr. Röser. The husband was only restored to health in July, but the wife never recovered; she lingered more than two years, and at last died after severe sufferings. The daughter, the man-servant, and the maid, who had eaten little of the tortured animal, were soon cured. The symptoms, in many respects, resembled those of the effects of the bite of rabid animals (and of the sausage-poison of Würtemberg?).”

Dr. Röser concludes his communication in these words:

“Many an animal (for example in hunting) is tortured to death in the most barbarous manner, like the roebuck in the snare. Ought not, then, the medical police to be led by cases like this to adopt the strictest regulations to prevent the use, as food, of animals which have in any way been tortured to death, and to insure that the animals intended for food are not tortured before being slaughtered.”¹

Every one, too, has noticed the feeling of fatigue experienced after severe physical exertion. This is of course due to structural changes in the muscles as well as to nervous exhaustion. It is also well known that the flesh of animals hunted to death is stringy, unsavory, and that microscopical examination shows the fibrillæ of the muscles to be ruptured, and separated from each other by minute extravasations of blood. In addition to these evidences of muscular change, we have that afforded by the waste of the muscular tissue—the *débris*, as it were—which appears in the urine, and which enables us to measure with considerable accuracy the extent of the decomposition, just as we can, by weighing the ashes, ascertain how much wood has been burnt.

Now, in regard to the brain, somewhat similar results ensue

¹ Dr. C. G. Carus, in *Der Menschenfreund in seiner Beziehungen zur belebten Welt*, quoted by Liebig in his *Familiar Letters on Chemistry*, etc. Third edition. London: 1851. Appendix No. 4, page 531.

from intellectual exertion, and although, as I have said, we cannot determine, with any degree of exactness, the nature of the change produced, we are not altogether without important data which tend to give us some ideas on the subject. These data I propose to make the basis of the present memoir, dividing them into two classes: those which relate to the circulation within the cranium, and thus to the diminished or increased amount of blood in the cerebral vessels, and those which refer to interstitial alterations of the brain-tissue.

I. That one of the primary effects of intellectual exertion is an increase in the quantity of blood circulating through the brain, does not admit of a doubt, except from those who contend that the cerebral circulation is not subject to variation under any circumstances. Experimental physiology has, however, determined this point so positively in the affirmative, that it is scarcely necessary to adduce the evidence in its support. It will be sufficient to recall the numerous facts observed, and experiments performed by others and myself, with reference to the immediate cause of sleep, by which it is shown that, during the condition of wakefulness, the quantity of blood in the brain is much greater than it is during sleep, the first being a state of intellectual activity, the latter one of almost complete rest for the brain.¹

Excessive mental exercise inordinately augments the activity of the cerebral circulation. The blood-vessels become over-distended, and, if the brain be long kept in a condition of extraordinary action, they may be rendered incapable of returning to their normal dimensions. Like a bladder filled to repletion with urine, they become in a measure paralyzed, and unable to contract upon their contents. A state of cerebral congestion is thus induced which gives rise to a set of symptoms perfectly characteristic, and fraught with peril to those in whom they occur.

Among the primary symptoms of this condition, wakefulness occupies a prominent place, and indeed for a time is often the only circumstance which attracts the attention of the pa-

¹ Those who desire to examine further into this question are referred to the writer's monograph entitled *Sleep and its Derangements*.

tient. He remains awake the greater part of the night, his mind either active with the affairs which have engaged it during the day, or else filled with the most preposterous ideas. Toward morning he obtains a little sleep, but he rises unrefreshed and ill prepared for the labors of the day. Indeed, when the affection is well established, mental or physical activity is almost impossible. So far as the mind is concerned, there is an indisposition to give the attention to any subject requiring much thought, and at times an absolute want of power to get correct ideas of any subject. This is especially seen in those who have arithmetical questions to solve, or long columns of figures to add up.

Before long, the mental symptoms become more evident. The ideas are confused and without logical arrangement, the memory begins to fail in regard to recent occurrences, and there is often a special disposition to omit words in conversation or writing, and to substitute others having a similar sound or appearance. The judgment is weak and vacillating, as shown by the difficulty experienced in making up the mind to any determinate course. Thus, a gentleman laboring under symptoms of cerebral congestion, induced by almost unremitting application to a very engrossing business, and who in good health was remarkable for his decision and firmness of character, told me that he had gone down to Wall Street several times every day, for many weeks, with a large sum of money in his pocket to invest, and always returned home without having been able to decide what to do with it. Any effort at continuous or severe thought increases the difficulties of the mind, and sometimes induces pain or uneasiness in the head. The intelligence becomes enfeebled, and it is frequently impossible for the patient to understand things which in his normal condition he easily comprehended. Illusions and delusions may both be present, but are not usually fixed, and the individual will himself often laugh at the absurd images he has seen, or ideas he has entertained, not five minutes before. Patients thus affected will often reason clearly in regard to apparitions or voices, of the unreality of which they are fully sensible.

In conjunction with these mental phenomena there are cer-

tain important physical symptoms of disordered cerebral action. Vertigo is very generally complained of, and there are likewise heat, pain, and a feeling of fulness in the head. In some cases the headache constitutes the principal feature of the disorder, and is almost constantly present. There are noises—such as roaring, rumbling, and ringing—in the ears; and sometimes bright flashes, at others dark specks before the eyes. Ophthalmoscopic examination, which should never be omitted, shows the veins of the retina to be increased in number, diameter, and tortuosity, and occasionally the optic disk is found more or less congested. The conjunctivæ are suffused; there is intolerance of light, and motion of the eyeballs is painful. Loud noises are likewise disagreeable. The face is flushed and the carotids throb with more than ordinary force.

Sensation and the power of motion are more or less affected, and generally, though not always, on one side of the body only. Thus the arm or leg feels heavy, and a sensation as of ants crawling over it, pins and needles sticking in it, or as if the limb was “asleep,” is experienced. Examination with the æsthesiometer shows that the ability to distinguish the two points of the instrument at the normal distance apart is less on the affected side than on the other, and that thus, to get the sensation of two points, they must be more widely separated when applied to the diseased side than is necessary for the corresponding parts of the sound side. The muscular strength is also lessened generally, but sometimes the difficulty is especially noticed in particular muscles, such as the *tibialis anticus* or the *deltoid*, which, losing a portion of their contractile power, cause the patient to experience an awkwardness in raising the foot, or elevating the arm from the side. The face, however, is rarely affected, even when the muscular power is diminished on all the rest of one side of the body, and the tongue when protruded comes out straight. Careful observation will generally detect some difficulty, perhaps slight, about the speech. Words are not pronounced with the same distinctness as before, especially when the patient is fatigued, or has been speaking for some time. The *linguals* and *labials* among letters are particularly troublesome, as well as all words which require the nice management of the end of the tongue for their

enunciation. The articulation is thick, and sometimes whole syllables are slurred over in a slovenly way.

The other organs of the body are more or less deranged. The pulse is unusually slow and full, the appetite capricious, the digestion imperfect, the bowels costive, and the urine scanty and high colored.

The foregoing constitute the ordinary assemblage of symptoms which are first met with in congestion of the brain, the consequence of excessive intellectual exertion, or the long-continued action of some powerful emotion. Some of them may be absent, others so slightly manifested as to escape ordinary observation, and others again so strongly exhibited as to excite the grave apprehensions of the patient and his friends, and to require him to keep his bed. Generally, however, they are not so severe as to prevent him attending, in a measure, to his ordinary avocations, and they may altogether disappear either by removal of the cause or in consequence of appropriate treatment.

Without suitable medical and hygienic treatment, they frequently precede a much more decided condition of cerebral derangement, and especially is this the case when some intense mental or physical cause, capable of suddenly increasing the amount of blood in the brain, is brought into action. This fully-developed condition may, in its general features, resemble apoplexy or epilepsy, or may be characterized by some of the phenomena of both these conditions. Attack after attack supervenes at intervals of a few days, weeks, months, or even years—each one leaving the patient more exhausted and enfeebled, bodily and mentally, than the immediately preceding seizure, until, at last, softening of the brain-tissue or disease of the blood-vessels, leads to imbecility, general paralysis, complete hemiplegia, or sudden death from extravasation of blood.

II. The symptoms characteristic of cerebral exhaustion are likewise well marked. Owing to excessive use, the brain-substance is metamorphosed into lower grades of matter faster than new tissue can be found to take its place. As a consequence the mind is enfeebled—for, to possess a strong and well-balanced mind, a sound brain is indispensable.

Now, one of the first effects of debility, whether in the brain or other organs, is rapidity of action at the expense of strength and completeness. A weak heart beats with great frequency, but with little force; an overtasked muscle is in a constant state of tremor from incomplete contractions, and feeble lungs inhale the requisite amount of air by frequent and shallow inspirations, instead of the slow and profound expansions which indicate strength in these organs. Similar facts are observed as regards brains. Even within the limits of health they may be noticed. Thus we often see persons with weak brain-power, and incapable of intense thought on any subject, giving evidence of great mental activity. Their brains, without thoroughly mastering any subject, take up an infinity of matters, and drop them, one after the other, after the most superficial consideration. Such persons, though remarkable for their vivacity, are really of very irritable dispositions. Their minds are like a piece of machinery without the balance-wheel. A brain may be originally of great power. This power proceeds not only from quantity but from quality. By over-exertion this latter is deteriorated, and imperfect mental manifestations are the result. Individuals who have tasked their brains beyond the normal limits, lose the capacity for deep and well-regulated thought: they become inconstant in their studies, their pursuits, and their ideas. Their opinions are as fickle as the winds, and their mental impressions, though numerous, are as transient as characters written in sand—at the same time it is observed that their dispositions are undergoing change. Trifling circumstances give them great annoyance, and the little troubles of life, which in their normal condition were scarcely noticed, now render them miserable. Radical changes of character may also supervene.

Of course the several intellectual faculties are more or less deranged, and the will suffers more than any other, unless, indeed, it be the memory.

The special senses are enfeebled, the general sensibility of the body lessened, and the motorial power considerably reduced. A long-sustained muscular contraction, as of the fin-

gers for instance, cannot be maintained; and hence a straight line cannot be made with the dynamograph.

As the cerebral condition becomes worse, the evidences of mental and physical decay become more palpable, and eventually dementia, as the result of softening, precedes the last stage—death. We know, with tolerable certainty, that increased intellectual exertion leads to an augmentation of the amount of phosphatic salts nominally present in the urine. Whether the group of symptoms just described is due essentially to the too rapid removal of phosphorus from the brain, without a corresponding assimilation of this substance into the cerebral tissue, is more questionable. Certain therapeutical facts, to which allusion will presently be made, would seem to indicate that it is no unimportant circumstance. It is probable, however, that defective nutrition of the brain, as regards other constituents, is not without great influence in causing derangement of its functions. Certainly this is the case where the stage of softening is reached.

Generally the two series of symptoms—those due to hyperæmia and those the result of mal-nutrition—coexist in the same patient. Cases are, however, occasionally met with in which they are distinct. In the case of a gentleman recently under my charge, the state first observed was that of congestion—gradually this disappeared, and the symptoms of defective nutrition supervened. The retinae were anæmic, and there was atrophy of the optic disks, indicating a deficient circulation of blood through the cerebral vessels.

In the treatment of the effects of excessive intellectual exertion, it is of the first importance to insist upon as complete a state of rest for the brain as it is possible to obtain. This, with a change of the current of thought, travel, exercise in the open air, and a full and nutritious diet, will often result in great alleviation of the symptoms, and sometimes in a perfect cure. Ordinarily, however, medical treatment must also be adopted, and this depends in a great measure upon the condition which exists in the brain. If the phenomena of congestion predominate, the administration of bromide of potassium cannot be ad-

vantageously omitted. I have ascertained,¹ by experiments upon living animals, as well as by observation of individuals who have taken it in large doses, that one of the principal effects of this substance is to lessen the amount of blood circulating through the brain. This it probably does by its action on the sympathetic nerve, whereby the calibre of the cerebral blood-vessels is diminished. To be efficacious it should be given in doses of at least twenty grains, and preferably thirty grains, three times a day. Under its use the symptoms of cerebral congestion, as described in this paper, disappear. Its administration should not be too long continued, and we have in the ophthalmoscope a ready means of ascertaining when its use should cease.

Along with it strychnia and phosphorus should be given, and especially if we have reason to suspect defective nutrition. The former I usually administer in solution in dilute phosphoric acid, one-thirtieth of a grain of strychnia to half a drachm of the acid, three times a day. The phosphorus may be given either in the form of phosphorated oil, of which the dose is from five to ten drops, or as phosphide of zinc, in doses of the tenth of a grain, three times a day. Cod-liver oil is also a very eligible agent, but I would not like to be deprived of phosphorus in any condition of the brain the result of mal-nutrition from over-exertion. Its effects are almost invariably decided and permanent, provided the patient can be brought to comprehend the danger he is in, unless he consents to use his brain in accordance with the principles I have laid down.

In addition, great benefit is to be derived from the prudent use of the primary galvanic current, both in contracting the diameter of the blood-vessels, and in improving the nutrition of the brain. To produce the former result, the positive pole should be applied over the sympathetic nerve in the neck, and the negative to the nucha. The same effect is also caused by placing one pole over each mastoid process, and thus passing the current directly through the brain. The instant the circuit is closed in either case, but especially in the latter, a feel-

¹ On Sleep and its Derangements, 1869. Also, Sleep and Insomnia, in *New York Medical Journal*, May and June, 1865.

ing of vertigo is experienced. If the retina be viewed with the ophthalmoscope at the time, the vessels will be seen to become smaller and less numerous. The employment of the current, so as to improve the nutrition of the brain, is best effected by placing one pole on the nape of the neck and the other on the forehead. Not more than sixteen elements should be used, and care must be exercised, even with this number, that the passage of the current be stopped as soon as the least sign of fatigue is experienced.

XIV.—OVARİOTOMY.

The History of Eight Cases of Ovariectomy. By T. GAILLARD THOMAS, M. D., Professor of Obstetrics and the Diseases of Women and Children in the College of Physicians and Surgeons, New York; Physician to Bellevue Hospital.

It is now just sixty years since the operation of ovariectomy was first introduced to the medical profession by an American surgeon. Dr. Ephraim McDowell, of Kentucky, performed this operation in 1809, the patient recovering from it and living twenty-five years afterward. Since that period, the most constant and acrimonious discussion has been, until within a few years, kept up, as to the propriety, I may even say the legitimacy, of the procedure. In spite of all opposition, supported as it has too often been by unfair argument and absolute misrepresentation, the operation has steadily advanced, and at the present time has reached a position so sure and unassailable in the esteem of the profession, that no one who desires to see his name stand in the list of those who favor advance in medical science ventures to depreciate it.

It is true that here and there will be found those who even now declare that the procedure is one too hazardous in its steps and too fruitless in its results to warrant its adoption. But these will almost invariably be found to stand upon the same level with the men who systematically vilify the speculum and anæsthesia, and depreciate the value of the microscope and ophthalmoscope.

Although this be true, the operation of ovariectomy is as yet too recent not to require the light which can be thrown

upon it by honestly reported statistics, and by them alone. Amputation of the thigh has been so often performed, for so many years, and in so wide an extent of territory, that the surgeon who now performs it is excusable if he does not report every case for the critical examination of his peers. All questions as to the value and results of the operation are at rest; and, although statistics with regard to it will always be of value, the profession no longer demands them as essential for its ultimate position as a surgical resource. With ovariectomy it is otherwise. Every case should be carefully and frankly reported, in order that it may serve to swell the numbers from which conclusions, whether favorable or unfavorable to the procedure, are to be drawn.

There are many influences at work at present which tend to keep up the mortality attendant upon this operation. Some of these are inherent to the operation itself, and will always exist; others, as knowledge increases with experience, and the basis upon which it rests becomes more stable and assured, will greatly diminish or entirely disappear. First among these must be mentioned the necessity for cutting into the peritonæum, exposing this delicate and important structure for a long time, and often leaving vessels open upon its surface, or within its cavity, which pour out blood that serves as material for putrefaction. Second, the difficulty of diagnosis must not be lost sight of. It is safe to say that in no pathological condition for which surgical procedure is adopted, not excepting that of internal aneurism, is this difficulty equalled. But it is not my intention to enumerate all the influences to which I have made allusion, and I shall content myself with the mention of a third. The observation of others may not agree with mine, and many may dissent from what I am about to advance, but to me it stands forth clearly as an influence which has done, and is doing, much to injure the position of ovariectomy as a surgical resource. It is this: the operation of ovariectomy is at present often performed by men inexperienced in the diagnosis and treatment of ovarian tumors. The statistics of some of the best operators prove that they have been progressively successful, as they have advanced in experience, and learned to avoid the dangers attendant upon the pro-

cedure, and we must conclude that they who operate for the first or second time, must damage the array of reported cases and increase the rate of mortality. I know full well that it may be objected to this statement, that if inexperienced men never operated, where would our supply of new surgeons come from? In reply to this I would remark, that if the professional relations of any man make it likely that he will be frequently called upon to perform this or any other operation, he should prepare himself to meet the demand upon him; but I cannot think it incumbent on any practitioner, upon whom no such demand is likely to be made, to have performed one or two operations of ovariectomy. I sincerely believe, as the result of observation, that the third influence which I have stated as marring the statistics of the subject, is by no means an insignificant one. With these remarks, I proceed to the history of,

CASE I.—*Large single cyst, with numerous small ones at base, of eighteen months' standing; removal by ovariectomy; recovery.*

Eliza B., native of Ireland, aged thirty-five years, by occupation a child's nurse, of perfectly temperate habits, single, and previously in good health, consulted me on the 1st of November, 1863, on account of an abdominal enlargement which she supposed to be "dropsy." About eighteen months before the date which I have recorded, she was startled by observing an enlargement about the size of a child's head low down in the abdomen on the right side. At first she kept the fact secret, but so rapidly did the swelling increase, that she sought the advice of her mistress, who requested a neighboring physician to see her. The examination of this physician led the patient to believe that he suspected pregnancy, although he made no such statement, and, being of rather a morbid disposition, she subsequently refused to see him or any other physician, until she came under my observation.

When I saw her she was in good health, her color was good, appetite moderate, spirits not depressed, and pulse normal. She stated, however, that for three months she had been

losing strength and flesh gradually, and that she was becoming troubled in respiration.

Physical examination revealed a large globular tumor filling the whole abdomen, and evidently pressing upward against the diaphragm. Fluctuation was obtained readily and clearly. Over the anterior face of the mass, dulness upon percussion existed, and the intestines were found displaced upward and laterally. The uterus was elevated, and anterior to the tumor. Regarding the case as one of ovarian cyst, I informed the patient of my conclusion as to the diagnosis, and advised her at once to submit to the operation of ovariectomy. To this she readily consented, and all was made ready for its performance. A good room was procured for her, as well as a skilful nurse, and the 1st of December was appointed for the operation.

The operation was performed at half-past 12, P. M.; the weather was cool, snow having fallen heavily on the day previous, but clear and bracing.

I was assisted by Drs. T. A. Emmet, George T. Elliot, J. S. Thebaud, Foster Swift, and G. S. Winston. Dr. Winston having produced anæsthesia by Squibb's ether, the patient was placed on a table, and, after evacuation of the bladder, the operation commenced with an incision by a bistoury in the median line, midway between the umbilicus and symphysis pubis, involving the skin and adipose tissue. This incision was two and a half inches in length, my intention being to prolong it if I found it necessary to do so.

Having cut down to the fibrous expansion formed by the conjoined sheaths of the recti, this was picked up by a tenaculum, and a very small opening made by scissors into the peritonæum, and a grooved director inserted, upon which this fibrous sheath and the parietal peritonæum were slit upward by the bistoury. The sac was now exposed, presenting a white, shining, fibrous surface. A small amount of straw-colored serum escaped from the peritoneal cavity, the result of congestion of the vessels compressed by the tumor. The hands having been carefully washed in warm water, two fingers were now passed into the peritonæum and swept over the surface of the tumor, ascertaining the fact that no adhesions existed, at least in its upper part. Firm pressure being now

made on the sides of the incision, by the hands of an assistant, a large trocar and canula were plunged into the cyst. Upon the withdrawal of the trocar, there rushed from the canula with great violence a little less than six quarts of a fluid looking like the rinsings of a vessel which had contained milk, and having floating upon its surface some little pellets, like fat. The edges of the incision in the cyst were now seized by the fingers, and in this way the sac was drawn out of the abdominal cavity. It came forth without resistance, no adhesions existing. The cyst was a degeneration of the right ovary, and at its base the Fallopian tube could be distinctly traced. In addition to one large cyst, were discovered, upon inspection, six or eight small ones, about the size of pigeons' eggs, and one the size of the foetal head was emptied as the large cyst was drawn forth.

A double thread of strong silver wire was now passed through the centre of the pedicle by means of a large needle, separated and twisted so as to ligate both sides of the pedicle, one of the ligatures encircling the right and the other the left portion. Another needle, similarly armed, was then passed at right angles to the first, and the two ligatures which it carried were disposed of in the same way. After this a strong ligature, composed of trout-line, was fastened above the silver ligatures, and the sac cut off by the bistoury just above it.

The abdominal incision was then closed by silver sutures one inch distant from each other. The pedicle was placed at the inferior angle of the wound, and kept from returning to the abdominal cavity by a darning-needle passed through it, and left with the point broken off and the extremities guarded by cork, at right angles to the pedicle, and flat upon the abdominal walls. A piece of patent lint, soaked in tepid water, was then laid over the wound, the whole abdomen covered with warm cotton batting, and an obstetric bandage applied with moderate tightness.

After the operation the pulse was found to be 76 to the minute, and as voluminous as before. The patient, who was not yet conscious, was then placed in a warm bed, hot bottles were put to her feet, she was covered carefully with warm blankets, and in fifteen minutes had ten drops of Magendie's

solution of morphine injected into the areolar tissue of the arm by the hypodermic syringe.

After this she slept quietly for between five and six hours. Upon awakening, she suffered slightly from nausea, but this soon passed off, the pulse rose to 96, but never went above it, and on the fourth day the bladder was emptied without the use of the catheter. The diet consisted almost entirely of milk for four days, when animal broths and farina-gruel were added to this. During the entire convalescence, pain and restlessness were quieted by the use of the hypodermic syringe; and pellets of ice, iced champagne and soda-water were freely given for the relief of the nausea which it created.

Seven days after the operation all the stitches were removed, except those immediately in contact with the pedicle, and on the eleventh day the patient, contrary to orders, sat up out of bed for a little while during the absence of the nurse. This produced no evil effect whatever; and on the next day the end of the stump was cut off, two remaining sutures removed, the abdominal bandage tightened, and the patient allowed to sit up for a short time. This was now repeated every day until she soon walked about the room.

At the time of writing this, it is six years since the operation, and I frequently see my patient in my visits to the children under her charge. She is in perfect health, and has never suffered from the operation, the only vestige of which is, a cicatricial line on the linea alba that is scarcely visible.

The fluid discharged from this sac was milky in hue, as I have said, and about six quarts in amount. Tested by heat and nitric acid, it behaved precisely like highly-albuminous urine, and, when rubbed between the fingers, gave the tenacious sensation experienced by smearing them with thin syrup and water. The specific gravity of this fluid was 1012.

CASE II.—*Fibro-cystic tumor, weighing 17 lbs., removed by abdominal section; death from shock in forty hours.*

Mary M., a native of Ireland, aged about thirty-two years, married eight years, never pregnant, applied to me in September, 1864, on account of an abdominal tumor accompanied by profuse menorrhagia. She stated that she had noticed an

enlargement of the abdomen about four or four and a half years before, but had paid no attention to it at first, as it gave her no inconvenience except mental anxiety on account of its presence. As it went on steadily increasing in size, however, she began to flow very freely at her menstrual epochs. This exhausted her to such a degree, and she had of late suffered so constantly from pain, distention, dyspnoea, and vesical irritation, that she strongly desired operative interference.

I kept the patient under observation for two months, endeavoring by palliative means to give her relief. At the end of this time, she and her husband urgently desired some more decided interference, and, as it appeared to me that her life would be sacrificed by the continuance of the symptoms which existed, I determined upon operating.

At this time, physical examination revealed a large globular mass in the abdomen, which appeared to yield fluctuation very perfectly. The intestines were pressed upward and laterally, and percussion over the whole anterior face of the abdomen yielded dulness. The uterus was normal in size, and to all appearance unattached to the tumor, a point which was carefully noted. Before operation, the patient was examined with me by Drs. Peaslee, Budd, and Loomis, all of whom agreed with me, that the case was one of ovarian cyst, that operation was legitimate, and that the prospect of recovery was ordinarily good.

The operation was performed in presence of Drs. Peaslee, Budd, and Loomis, the house-staff of Bellevue Hospital, and a large number of medical students, at 3 P. M., in a ward of Bellevue Hospital which had just undergone complete renovation, and which contained no other patients. An incision two inches in length was made over the median line, midway between the symphysis pubis and umbilicus. When the conjoined sheaths of the recti were reached, the operation was arrested until all oozing had ceased; then the sheath was caught up by a tenaculum, a small opening cut, a grooved director passed, and upon it a bistoury slid up so as to open the peritonæum. The anterior wall of the tumor being then exposed to view, a steel sound was dipped in warm water and passed around it in search of adhesions, but none were discovered.

Palpation of the tumor was now practised by myself and the gentlemen who aided me, and, as it appeared to us all certain that it consisted of a sac filled with fluid, I plunged in a large trocar and canula. To my surprise, instead of a gush of fluid, a free flow of blood occurred, and, withdrawing the trocar, I found that the tumor was not a sac filled with fluid, but a cystic sarcoma. The flow of blood from the deep wound made with the trocar was so free, that it was thought best not to abandon the operation, but to extirpate the tumor. Accordingly, I enlarged the incision to about five inches in length, and very readily turned it out of the abdomen. The pedicle was soon discovered on the left side; it was small, but very short. Ligating this with a strong cord made of silk threads, I cut it close off, and returned it to the abdomen. The wound was then closed by interrupted silver sutures which involved the peritonæum, and dressed with cold-water dressing, held in place by the obstetric bandage. The patient, who had been kept under the influence of ether not quite an hour, was now put to bed, and warm bottles were applied to her feet, and ten drops of Magendie's solution of morphine were thrown into the areolar tissue of the arm by the hypodermic syringe.

Just after the operation I felt the pulse, found it beating at the rate of 160 to the minute, and so feebly as to give me great apprehension as to whether the patient would not die on the table. After she had slept for an hour, the pulse sank to 140, and became stronger, but it never became less frequent. When consciousness was restored, the patient seemed much depressed in mind, declared that she knew she was going to die (she had been quite sanguine before the operation), moaned constantly, and looked wild and unsettled. Throughout the next day this singular condition continued. She took milk-punch when urged, but desired no food, and nothing to drink except ice water. I saw her at midnight on the second night after the operation, and it was then evident that collapse was approaching. In spite of continued dry warmth kept up at the feet, and as high as the knees, the extremities became cold; a clammy perspiration broke out over the whole surface, and toward morning the patient died.

A *post-mortem* examination revealed no trace of peritonitis and no secondary hæmorrhage.

The tumor, when placed upon a table and palpated, was so deceptive in its apparent yielding of fluctuation, that it was even then declared to contain fluid which had not been reached by the trocar, and this view was entertained until it was bisected. It was found that it consisted of loose fibrous elements, forming numerous loculi, about the size of a hickory-nut, which were filled with a honey-like material. After section had allowed what was computed as about three pounds of this material to flow away, the tumor weighed a little more than fourteen pounds.

To one not familiar with the difficulties attendant upon the diagnosis of these cases, and their differentiation from cystic disease, it may appear astonishing that so grave an error should have been made in this case. They who have encountered them will readily agree that not only is diagnosis very difficult, but often impossible, without exposing the patient to the risks of paracentesis. In this case I did not resort to this explorative procedure, because my mind did not admit a doubt as to the true nature of the tumor. On two other occasions I was, with others, similarly deceived: one was a case, that I saw in consultation with Dr. Peaslee, and in which he subsequently made an explorative incision that proved fatal; the other was removed by a long abdominal incision by Dr. O'Reilly, the patient dying on the seventh or eighth day.

CASE III.—*Alveolar cancer of left ovary; ascites; removal of cancer; return of pedicle to abdomen; death of patient on eighth day, from septicæmia.*

Mary McC., aged twenty-one years, single, a cook by occupation, was sent to me by her employer on account of an abdominal enlargement. Upon examination I found her very sallow, almost jaundiced in appearance, very large about the abdomen, and exceedingly weak. She informed me that just one year before that time, she had noticed a slight abdominal enlargement, which had steadily and rapidly increased. At the same time she had emaciated rapidly, grown very weak

and low-spirited, and now felt that, unless relieved very soon, she would die from exhaustion.

Physical exploration revealed a large accumulation of fluid in the peritonæum, and, in addition, a round tumor occupying the whole of the left side of the abdomen.

Although the case was not looked upon as a favorable one for operation, it was determined that, since extirpation offered the best chance for the saving of life, it should be resorted to. Accordingly, in the presence of Drs. Otis, Swift, Reynolds, Fimmell, and Hull, I undertook the operation.

The patient having been anæsthetized with ether, I cut down slowly through the abdominal walls into the peritonæum. Instantly a large amount of peritoneal fluid escaped, a much larger amount, indeed, than had been computed in the diagnosis. After its escape, I found in the left side of the abdomen a solid mass about the size of a large cabbage, and resembling in feel and appearance an ordinary cauliflower. This was attached to the broad ligament at about the point ordinarily occupied by the ovary. It was too large for removal through the small opening which I had made, but this being enlarged, it was readily turned out. Securing the pedicle, which was short, by two strong hempen ligatures passed through its centre, it was returned, after removal of the growth, to the abdomen, and the abdominal incision closed by interrupted silver sutures.

The patient rallied well after the operation. She was kept upon beef-tea, milk, and gruels, and quieted by administration of opium. Her pulse kept up to about 100, respiration was normal, and nothing existed to excite alarm except the extreme nervous depression of the patient. She asserted that she would certainly die, and really seemed convinced that such would be the case. With the exception of this symptom she appeared to be progressing favorably until the seventh night. Then she seemed more than usually nervous and excitable, and desired to see the priest, who was accordingly sent for.

On visiting her early on the morning of the eighth day, I found that a great change had come over her during the night. Her eyes were wild and haggard, her face maniacal,

her tongue red and dry, and she constantly talked in an incoherent and violent manner, as is so often found to be the case in puerperal mania. As I entered the room, she covered her head with the bedclothes, and screamed out that I had leagued with the priest to murder her. Nothing would pacify her, or dissuade her from this view. After soothing her for some time, I succeeded in getting near enough to her to find that the pulse was beating at 160 to the minute, and that the breath yielded a sweetish odor like sugar-cane. I was now convinced that she was suffering from septicæmia, and that the mania which had supervened was due to it. But, even with this knowledge, nothing could be done in the excited state of the patient. She remained in the maniacal state which I have described till evening, when she sunk into coma and died. No *post-mortem* examination could be obtained.

CASE IV.—*Multilocular ovarian cyst ; removal by short incision ; pedicle ligated with silk, and returned to the abdominal cavity ; recovery.* History recorded by Dr. JAS. L. BROWN.

Miss C. W., twenty-two years of age, consulted Dr. Thomas in the early part of December, 1867, with reference to an abdominal tumor which she had first noticed nearly a year previously, and which had been growing rapidly during the past six or seven months.

She stated that her general health had been excellent until September, 1866, when there began to be some irregularity in her menses. The periods became more frequent, occurring at intervals varying from eight days to a fortnight, the duration and quantity of the flow being about the same as before. In a short time her general health began to be impaired, and medical advice was sought on account of the menorrhagia which was supposed to be the cause of her ill health. Failing to receive any benefit from the physician first consulted, other advice was sought, and no less than twelve physicians, nearly all of them homœopathic practitioners, were consulted without avail, before Dr. Thomas was asked to see the case. No vaginal or other physical examination was ever made or proposed by any of these gentlemen. The existence of the tu-

mor in the abdomen was first noticed by Miss W. some three or four months after the disturbance of the menses. At first she merely observed a hardness, which seemed to make its appearance with the menstrual flow and subside with its cessation. In a few weeks, however, this hardness was found to be persistent and to be steadily increasing in area. With the growth of the tumor there was a corresponding depreciation of the patient's health, which had become very greatly impaired when she first was seen by Dr. Thomas. The menorrhagia was persistent during the whole of this period, the intervals never exceeding two weeks, and rarely extending beyond ten or twelve days. On examining the case, Dr. Thomas found no difficulty in recognizing the presence of a cystic tumor of the ovary, and recommended its removal by ovariectomy. The recommendation was accepted by the patient and her friends, and the operation performed December 15, 1867, by Dr. Thomas, with the assistance of Drs. E. R. Peaslee, J. B. Reynolds, Mintzer (of Philadelphia), and J. L. Brown. The external incision through the integuments was about three and a half inches in length, the internal incision through the peritonæum being about half an inch less. The tumor was found to be multilocular, and the main cyst on being tapped discharged a chocolate-colored fluid of about the consistence of cream. A second cyst about half as large contained a clear gelatinous fluid of much greater consistency. After evacuating these and several smaller cysts, the sac was readily removed through the opening, no adhesions existing anywhere. The pedicle, which sprang from the right side, was transfixed by a needle armed with a double silk ligature and tied in segments, each ligature including one-half of it. The actual cautery was then applied to the cut edge, and the charred portions pared off with a scalpel, after which the pedicle was returned to the abdomen.

A small quantity of blood which had found its way into the pelvic cavity was then carefully sponged out, and the wound was closed with six wire sutures, between which were inserted five pins after the manner practised in operations for harelip. A layer of soft cotton was placed over the wound, and an ordinary obstetrical bandage around the abdomen. The patient was then placed in bed, and ten drops of Magen-

die's solution of morphine administered. The whole duration of the operation, including the anæsthetizing, was just two hours.

8 P. M.—Patient entirely recovered from the effects of the ether. No pain or nausea. Pulse 84, and tolerably full.

16th, 9 A. M.—Passed a comfortable night, but did not sleep much. Pulse 86. No pain or nausea. Used catheter.

8½ P. M.—Begins to be troubled with flatus. Otherwise comfortable. Pulse 108. No nourishment except two tumblerfuls of milk. Has been kept moderately under the influence of morphine. Used catheter.

17th, 8½ A. M.—Passed a good night. No morphine since 9 last evening. Pulse 84. Skin cool and comfortable. Mind bright and cheerful.—12 P. M. Condition about the same as in the morning. Has thus far taken no nourishment but milk, of which she drank about a quart to-day. No trouble from flatus since yesterday. Still obliged to use catheter.

18th, 9 A. M.—Passed a good night. Pulse 84. Condition about the same as yesterday morning.—11 P. M. Has taken no morphine in twenty-four hours. Begins to suffer from irritability of the bladder; otherwise quite comfortable. Pulse 88. Milk diet only.

19th.—Suffering some distress from irritability of the bladder; otherwise comfortable. In the evening was able to evacuate the bladder without the catheter for the first time since the operation. All the pins were removed to-day. Pulse 90.

20th.—Pulse 96. All the sutures taken out to-day. Patient comfortable, but quite weak. Ordered egg-nogg, sherry wine, and quinine. Pulse rose in evening to 108.

21st.—Better in every respect. Pulse 86, and full.

The convalescence of the patient was now uninterrupted until the 31st of December, when she was taken with an attack of peritonitis, which was confined to the right iliac region, and which, although it assumed quite a threatening aspect for two or three days, finally yielded to treatment, and the patient made a good recovery. The menstrual function was reëstablished about two months after the operation, and has since been perfectly regular in every respect.

P. S.—Since the foregoing account was written, the patient has been married.

CASE V.—*Multilocular ovarian tumor; removal by short incision; pedicle treated by clamp; recovery.*

Mrs. Y., aged forty years, a native of New Jersey, married, and the mother of a large family, consulted me in the month of March, 1869, by advice of Dr. Van Riper, of Passaic, under whose care she had been. The patient was a thin, wiry, and enduring woman, who had enjoyed good health up to one year before the time at which I saw her. At that time she noticed an abdominal enlargement. This gave her no anxiety, as she supposed it to be due to pregnancy. She was somewhat surprised, however, to find that, in spite of its steady increase, she still menstruated, and as her periods occurred every two weeks after the sixth month was passed, she became alarmed and sought medical advice. For about six weeks before the operation which I am about to describe, she suffered from abdominal pain, but until that time she had not done so. About the same time she lost appetite, became somewhat depressed in spirits, and failure in strength and flesh was observed.

When I saw the patient in March, I found an irregular nodulated tumor filling the abdomen. Toward the left lateral surface of the mass a protuberance, equal in size to the head of a newly-born infant, was formed, and below this others of less size could be discovered. Percussion over the abdominal surface yielded dulness, and palpation gave fluctuation distinctly. Vaginal touch revealed the uterus pressed forward and upward, and discovered no protrusion in Douglas's *cul-de-sac*.

I looked upon the case as one of multilocular ovarian cyst, and advised operation, which was determined upon, and accordingly performed on the 26th of April, 1869, in presence of Drs. Willard Parker, C. Van Riper, Robert Stewart, W. J. Cadmus, J. H. Kenworthy, Garnet Terhune, R. A. Terhune, James L. Brown, and W. Linsley.

The day was clear and the weather very comfortable. The patient being placed upon her back, on a firm table, before a

window admitting a good light, ether was administered by Dr. Stewart. I then made an incision of two inches in length in the median line, exposed the tumor, and plunged in a large trocar and canula. There instantly gushed forth an albuminous looking fluid, which flowed until the largest cyst was emptied. Then turning the canula so as to plunge it into two others, which were quite large, I emptied these, and easily withdrew the sac, which was free from adhesions. The pedicle was then secured by a clamp, and the wound closed by interrupted silver sutures.

The time occupied in the operation was forty-five minutes; the weight of the tumor twenty pounds; and the amount of fluid removed from it a little over two gallons.

Subsequent to the operation the case was carefully watched by Drs. Van Riper and Stewart, and the details which follow are taken from notes by the latter gentleman.

"Three hours after the operation, pulse 60, slightly intermittent; surface cold; expression natural; no pain; says she feels happy; urine voided naturally; slight nausea. One grain of opium was given in pill.

"*April 27th.*—Rested well; expression good; no pain; pulse 70; tongue clean; urine voided naturally; respirations 20 to the minute. She was given to-day beef-tea and milk, and just enough opium to quiet restlessness.

"*April 28th.*—Called to patient on account of great pain down left thigh; drew off urine with catheter, and gave one grain of opium, which relieved her. Pulse 60; respiration 20.

"*April 29th.*—Pulse 72; respiration 20; stump dressed with carbolic acid."

From this time onward the notes vary so little from those just given that it is useless to state them. The patient went on to recovery without an unfavorable symptom. On the seventh day after the operation the clamp was removed and the sutures withdrawn. The whole abdominal wound was found closed by first intention, except just around the pedicle. In a fortnight after removal of the tumor, the patient sat up in bed. Now, six months after the operation, she declares herself to be in better health than she has experienced for many years.

CASE VI.—*Multilocular ovarian tumor; firm adhesions; pedicle treated by clamp; recovery.* Notes by Dr. BENJAMIN RIGGS.

Johanna Murphy, aged forty, born in Ireland, a widow, was admitted to Bellevue Hospital, April 29, 1869.

The patient states that she has borne three children; that all her confinements were natural, and without bad results.

She menstruated regularly till September, 1868, when she was seized with flooding two weeks before the proper time of menstruation. During the three months following she did not menstruate at all. In October, 1868, she first noticed a swelling of the abdomen, which since that time has steadily increased, but she does not know that it commenced on either side. From January to March, 1869, she menstruated regularly. In March she had a second attack of flooding, lasting six days, and leaving her very weak. Two weeks before admission was flooding for about a week, and was much reduced in strength.

Physical Signs on Admission.—The patient has a tumor of the abdomen, fluctuating at all points, dull on percussion, excepting tympanitic resonance on the left side, extending from the ensiform-cartilage to the pubes. Measurement between anterior-superior spinous process through the umbilicus twenty and a half inches, largest girth thirty-five and a half inches.

On vaginal examination, the uterus is found movable, and no fluid seems to fill the *cul-de-sac*. The tumor does not seem to sag much in the flanks when the patient lies down. Some abdominal pain is complained of, and the patient is low-spirited, wanting in appetite, and somewhat emaciated, though always of spare habit. There seems to be some mental derangement: she attributes her tumor to a rattlesnake which she supposes she swallowed while drinking from a pool some time ago.

In May diuretics were tried without effect upon the tumor, which increased steadily though very slowly. During the early part of June a tonic treatment was adopted, and a generous diet with some stimulants allowed, preparatory to an operation. In May and June there were several irregular and small discharges of blood from the uterus.

On the 18th of June, the patient was in fair condition and spirits, and Dr. Thomas decided to operate. An anæsthetic being given, an incision about two inches long was made in the median line between the umbilicus and the pubes. On reaching the sac, a trocar was introduced with a canula of such construction that the sac and external coverings were clamped together, and leakage into the peritonæum prevented. Several cysts were now discovered and successively emptied. The large one, which was first reached, contained clear, viscid fluid in large quantity. Two others contained grumous fluid full of flocculent lymph. The whole tumor was but slightly adherent in front, more strongly attached behind and below.

After evacuating all fluid contents and separating the attachments, the mass was withdrawn through the original opening, which was slightly enlarged before this could be done. The pedicle, of considerable length, was cut and retained by a clamp outside the wound, which was sewn up so as to grasp it tightly. Immediately after the operation there was considerable shock. About thirty minims of Magendie's solution of morphine were given hypodermically through the night, and eight ounces of whiskey by the mouth. Next day the pulse was full and under 100, no pain or restlessness. Urine drawn off every four hours. Wound dressed with weak solution of carbolic acid. In the evening there were restlessness and some vomiting; skin hot and pulse rapid. Fifteen minims of Magendie's solution of morphine were given as before.

June 20th, A. M.—Slept badly. Stomach irritable all night. Fifteen minims of the morphine solution were given hypodermically.

June 21st.—Better, pulse about 80. Has some appetite.

June 22d.—Pulse 80. Scarcely any pain. Condition improving.

June 23d and 24th.—Pulse about 100. Appetite and general condition still improving.

June 25th.—A week, less five hours, after the operation, the clamp was removed. A small abscess in the abdominal walls opening into the wound, treated by charcoal poultices.

June 26th.—Bowels moved twice spontaneously. From this time convalescence went on rapidly without a bad symp-

tom, and the patient was discharged perfectly well about the end of July. No abnormal increase in the size of the abdomen occurred from the time of operation until that of discharge.

CASE VII.—*Multilocular ovarian cyst; removal of four-fifths of the sac; pedicle and ligatures left in the vagina; death from peritonitis.*

Mrs. Van T., a native of Holland, forty-five years old, married, mother of one child; was seen by me in consultation with Dr. N. S. Drake, of Brooklyn, in June, 1869.

The tumor had been first observed about eighteen months before I saw her, and had steadily increased in spite of a variety of plans of local and general treatment which had been pursued under the advice of physicians whom she had consulted before calling upon Dr. Drake. No diagnosis had been made before Dr. Drake saw her. He at once recognized the nature of the case, and requested me to see her in reference to operation.

The patient, at the time I first saw her, was in good general condition, not emaciated, and quite hopeful as to the issue. The abdominal surface yielded dulness on percussion, and the sense of fluctuation could be readily appreciated. As there were no obscure points to be settled by paracentesis, I proposed operation at an early day. This was gladly acceded to, and accordingly on Sunday, June 27th, ovariectomy was performed in presence of Drs. Drake, Hutchison, G. K. Smith, Turner, Simmes, and Mulhallan, of Brooklyn; and Drs. Peaslee, Sands, and Jas. L. Brown, of New York.

The patient having been brought fully under the influence of ether, an incision three inches long was made over the median line between the symphysis pubis and the umbilicus. The peritonæum being reached, a steel sound was swept over the circumference of the tumor, and by it universal, though very delicate, adhesions were found to exist. These were readily broken down, and a large trocar and canula were plunged into the cyst. A clear fluid like spring-water flowed away, and the cyst collapsed. This fluid was found to be slightly albuminous by the tests of heat and nitric acid. It resembled pre-

cisely that which flows from cysts of the broad ligaments, although this cyst was certainly one of ovarian character.

Traction being made upon the emptied sac, it came forth for about four-fifths of its extent, but farther than this it could not be drawn. I then enlarged the abdominal opening, and found that from the pelvis sprang extensive and powerful adhesions which bound down the whole base of the sac. I strove to break these, but it was slow and painful work, and in the end I was forced to leave in the abdomen about one-fifth of the sac. The pedicle was so short that I could not employ a clamp, and so large that I dared not leave it in the abdomen. I therefore secured it with a strong hempen cord, cut an opening into the vagina through Douglas's *cul-de-sac*, and left cord and pedicle in the vagina.

The peritoneal cavity was now so filled with clots of blood, that I did not wish to keep the patient anæsthetized for so long a time as sponging them out would require, so I introduced through the abdominal opening the long nozzle of a Davidson's syringe, and cleansed the abdomen by a stream of warm water which swept all accumulations before it as it escaped into the vagina.

The patient was under the influence of ether from 3 to 5 o'clock. The pulse, which was 80 to the minute at the commencement of the operation, remained so until the evening of the next day, about twenty-four hours, when it rose to 112. Symptoms of peritonitis then developed themselves, and she died on Wednesday at 5 p.m., precisely seventy-two hours after the operation. Subsequent to the operation she was fed on beef-tea and milk, pain relieved by opium, and the bladder kept empty by the catheter.

CASE VIII.—*Alveolar cancer of both ovaries; removal by ovariectomy; pedicles treated by actual cautery; death from peritonitis.* Notes by Dr. BENJAMIN RIGGS.

"Elizabeth Harrison, aged twenty-seven, born in New York, married, was admitted into Bellevue Hospital, April 28, 1869.

"Patient is a remarkably robust woman. Has been married for two years, but has never been pregnant. She menstruated regularly every three weeks till January, 1869. Since January

menstruation has been irregular and painful, occurring, on an average, about once in two weeks, with a greatly increased loss of blood. In January she first noticed a swelling in the left iliac fossa. Pain in the same region commenced about a week later. This swelling has rapidly increased, accompanied by a good deal of pain. The tumor is pyriform; no sagging in the flanks. Obscure fluctuation only can be felt. June 9th, the abdomen is very full and tense, and there is excessive pain. The fluctuation is very obscure, and Dr. Thomas thinks the tumor may be colloid cancer. An exploratory trocar brought away fluid. Tapping was at once resorted to, and from four to five gallons of clear fluid were evacuated, to the patient's great relief. The fluid was alkaline, viscid, and highly albuminous. For four days the patient was kept quiet by opiates, some soreness being complained of in left iliac fossa. This had disappeared on the fifth day, and the bowels were moved by enema. It was determined, with patient's consent, to perform an operation for the removal of the tumor, now presumed to be an ovarian cyst.

"*June 26th.*—Bowels thoroughly moved. June 27th, one grain of opium night and morning. June 28th, A. M., one grain of opium. 2½ P. M., after freezing the parts, an incision was made down to the sheath of the rectus muscle, extending in the median line from an inch below the umbilicus nearly to the pubes. The fat through which the incision was made was fully three inches thick. By 3½ P. M. all oozing from the wound having ceased, the patient was anæsthetized, and the incision carried down to the peritonæum, which since the tapping had partially refilled, but the abdominal walls were by no means tense. On opening this membrane, there was a gush of clear yellow fluid, and exploration showed that no ovarian cyst existed; the fluid present being contained in the peritoneal sac. Attached to each ovary were found soft fungous growths—these were removed, and the parts from which they sprang seared with a red-hot iron. The peritonæum was washed with a weak solution of common salt, and, all hæmorrhage having apparently ceased, the wound was closed. Deep quill sutures were used, and the superficial edges of the wound were held together by pins and twisted silk at some points, at others by ordinary in-

interrupted wire sutures. Anæsthesia was continued, in all, one hour and a half. Immediately before the administration of the anæsthetic, ten minims of Magendie's solution of morphine were given hypodermically.

"After the operation, the patient slept through the afternoon and evening till about midnight, when there was some vomiting. Toward morning there was recurrence of vomiting, and she suffered pain in the abdomen. Her pulse was 105. About half a grain of morphine was given during the night.

"*June 29th*, 10 A. M.—Abdominal pain is complained of. Pulse 120; quarter-grain of morphine given; 2 P. M., vomits considerably. Later in the afternoon febrile excitement ran high, but she complained less of pain. During the night morphine was given.

"*June 30th*, A. M.—Pulse diminished in frequency and hardness; skin cooler. At night she grew worse again, pulse 140; skin hot and dry. Toward midnight she became quieter, and slept.

"*July 1st*.—Vomits a good deal this morning; P. M., vomiting persistent; pulse 120. She takes nothing but a wine-glassful of champagne every half hour, followed by a little carbonic-acid water.

"*July 2d*.—Vomiting persisted, and pulse remained about 120 till 3 A. M., when the patient began to fail in strength, the pulse increasing in frequency. The extremities became cold, and her face was covered with a clammy sweat. At noon the pulse was 140, and irregular; at 2 P. M., 165; at 4 P. M., she died.

"*Autopsy, July 3d*.—Brain not examined. Heart 11 oz. in weight; flabby; valves normal. Lungs—hypostatic congestion at their bases; the right lung adherent. Liver, 3 lb. 10 oz. in weight; adherent to diaphragm and stomach by old false membrane. Kidneys—nothing noticeable; weight 10 oz. Spleen, 3 oz. Bladder—mucous membrane congested.

"An incision $7\frac{1}{2}$ inches long, extended through the abdominal walls and peritonæum. Peritonæum separated from rectus muscle at its lower portion, and the cellular tissue at this point partly gangrenous. All the intestines adherent to each other and to the abdominal walls by recent lymph. Peritoneal cavity

contains about 8 oz. of dirty-brownish sero-purulent fluid. There is considerable injection of peritoneal vessels.

"The organs in the pelvis adherent to one another by old false membranes. Left ovary gone, its site marked by lacerated tissue. Right ovary lacerated at one point, the major part of it remains *in situ*, it is swollen and vascular, and its vesicles for the most part contain small clots of blood.

"Fallopian tubes, convoluted, dilated, adherent; the left contains bloody muco-pus. Uterus contains nothing but a small mucous polypus in its body."

I have spoken of this case and of Case III., as instances of alveolar cancer, not because I regard them as being true carcinomatous disease, but because the question of their pathology is not settled, and I prefer rather to abide by the old nomenclature than to discuss the matter. From a clinical stand-point, they certainly do not appear to belong to the family of true cancer. The appearance of the patient, the hue of the complexion, and the constitutional condition of those who are affected by them, seem to contradict such a supposition. To the touch and sight they resemble very closely cauliflower growths of the cervix uteri, and seem to belong to the family of vegetating epithelioma. My colleague, Dr. H. B. Sands, kindly examined for me a portion of the growth taken from Case VIII., and thus describes its appearance under the microscope.

"Sections of the tumor, when examined under the microscope, exhibited the following elements: 1. Connective tissue, slightly vascular, arranged in the form of villi, either club-shaped or conical. 2. Flat epithelium, in several layers, covering the villi, but not present in their interior. The appearances observed were those commonly seen in epithelial or cauliflower growth."

CASE IX.¹—*Multilocular cyst, containing numerous large cysts; removed by short incision; pedicle treated by clamp; recovery.* Notes by Dr. C. S. WARD.

Annie Farrell, aged fifteen years, single, presented herself at the clinic at the College of Physicians and Surgeons, October 15, 1869, on account of an abnormal enlargement, which

¹ This case received while passing through the press.

she first noticed about one year and a half before, and which had been steadily increasing until it had now attained a size exceeding that of the uterus at full term of pregnancy. At the age of thirteen she menstruated once, since which time there has been no menstrual flow. Owing to this circumstance she had been led to believe that her increased size might be due to retention of the menses; in fact, she stated that this opinion had been expressed by some physician whom she had consulted. She first noticed the tumor in the left iliac region; it appeared to be smooth, and globular in shape. Five or six months later she noticed that it began to be irregular in outline and nodulated. Within the last three months her general health had begun to fail, and she became much reduced both in flesh and strength. Her face was pale and sallow, and her general appearance cachectic. On physical examination the abdomen was found distended with a fluctuating tumor, imbedded in which could be felt three smaller tumors of firm consistence. These were on the left side, and conveyed the impression of being solid masses. With a view to facilitate diagnosis as well as to afford temporary relief to the patient, Dr. Thomas tapped the tumor on the following day; about a gallon of clear fluid, of the consistence of thick mucilage, was discharged, which greatly relieved the patient. The seemingly solid tumors could now be felt more distinctly, and conveyed the feeling of obscure fluctuation.

The girl's general condition became much improved, although the tumor began to refill, and at the end of three weeks was again as large as before. Ovariotomy now being the only resource, this operation was resorted to on the 4th of November, 1869, in the presence of Drs. Peaslee, Budd, Norcom (of N. C.), Burgess, Rowe, James L. Brown, H. F. Walker, and C. S. Ward. The patient being fully anæsthetized, an incision three inches in length was made in the median line, midway between the umbilicus and symphysis pubis, down to the peritonæum; after all hæmorrhage had ceased, this was lifted, snipped, and slit upon a director, allowing a slight flow of serum, and exposing the tumor. A sound was swept around the tumor, and only one or two slight adhesions found, which were gently broken. A trocar was then plunged into the

principal sac, which discharged a clear fluid like that drawn off at the previous tapping, and through this sac about a dozen other cysts of various sizes were punctured and the contents evacuated. The fluid in all these sacs was clear and limpid, but in some of much greater consistence than in others. All the cysts being emptied, the sac was readily drawn out and the pedicle secured by a clamp; the tumor was then separated and the actual cautery applied to the cut surface of the pedicle. The other ovary was examined and found normal. The peritoneal cavity was carefully cleansed by soft sponges squeezed out of warm water. The wound was closed by five sutures of iron wire passed through the skin and peritonæum, the pedicle being left at the lower angle of the incision; a pledget of lint soaked in a carbolic-acid solution was laid over it, and a binder applied, as after parturition. Five minims of Magendie's solution were injected subcutaneously and the patient placed in bed. Time of operation forty minutes.

Progress of Case.—November 4th.—At 4.30 (immediately after operation) pulse 88; 10.30 P. M., 104; $\frac{3}{4}$ gr. morphia given.

November 5th.—9 A. M., pulse 100; rested well during the night; 6 P. M., pulse 122; skin moist, sleeping quietly, has had no pain.

November 6th.—9 A. M., pulse 120; took $\frac{1}{8}$ gr. morphia last night and rested well; 6 P. M., pulse 104; patient cheerful and comfortable, has taken three pints of milk and six ounces of beef-tea to-day.

November 7th.—10 A. M., pulse 102; rested well during the night; no morphia given; 6 P. M., pulse 100; patient in fine spirits; has taken milk, toast, beef-tea and steak.

The patient has complained of no pain since the operation, no tenderness on pressure, no tympanites, wound looking well. Subsequent to this period the patient has gone on steadily improving until the date at which this manuscript goes to press, November 8.

In this report are embodied nine cases of ovariectomy. Five of them resulted favorably and four unfavorably. Out of the four unfavorable cases, two were instances of so called alveolar cancer, one a solid tumor, and one a cyst, the whole of which could not be removed. Six cysts were operated upon. Of

these, five recovered, and that which ended fatally was a case in which one-fifth of the sac had to be left in the abdomen.

The operation of ovariectomy was only in two cases preceded by that of paracentesis. This was due to my desire to avoid an additional risk to my patients. I believe, however, that, in thus avoiding paracentesis, I committed a grave error. A more frequent resort to it would have cleared up many obscurities as to diagnosis, and thus prevented resort being had to ovariectomy in at least one of my fatal cases. My experience thus far will induce me, in the future, to resort to it much more generally than I have done in the past.

Case IX. recovered without an unfavorable symptom. The clamp was removed and sutures withdrawn on the eighth day.

ADDENDUM.

To the article by Professor Taylor, *On Amputation of the Cervix Uteri in Certain Forms of Procidentia, and Remarks on the Complete Eversion of the Cervix Uteri*, page 33, add the following:

Since this paper was prepared for publication, eighteen months ago, eight more cases have been operated upon, making, in all, eighty-four cases, with thirty-four favorable results. Some of these last cases have been retained in the Bellevue and the Charity Hospital for several months, and have been seen by those interested in the results. The uterus retains a normal position, the os tincæ being two and a half inches from the vulva.

